University of WINDSOR

WINDSOR, ONTARIO

Pam.

FACULTY OF
APPLIED SCIENCE

CALENDAR

1972•1973

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THE FACULTY OF EDUCATION
THE FACULTY OF PHYSICAL AND HEALTH EDUCATION
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THE DIVISION OF EXTENSION (SUMMER SESSION)
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PART A

UNIVERSITY OF WINDSOR

WINDSOR, ONTARIO, CANADA

and its

Federated and Affiliated Institutions

ASSUMPTION UNIVERSITY

HOLY REDEEMER COLLEGE

CANTERBURY COLLEGE

IONA COLLEGE

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CALENDAR

1972-73

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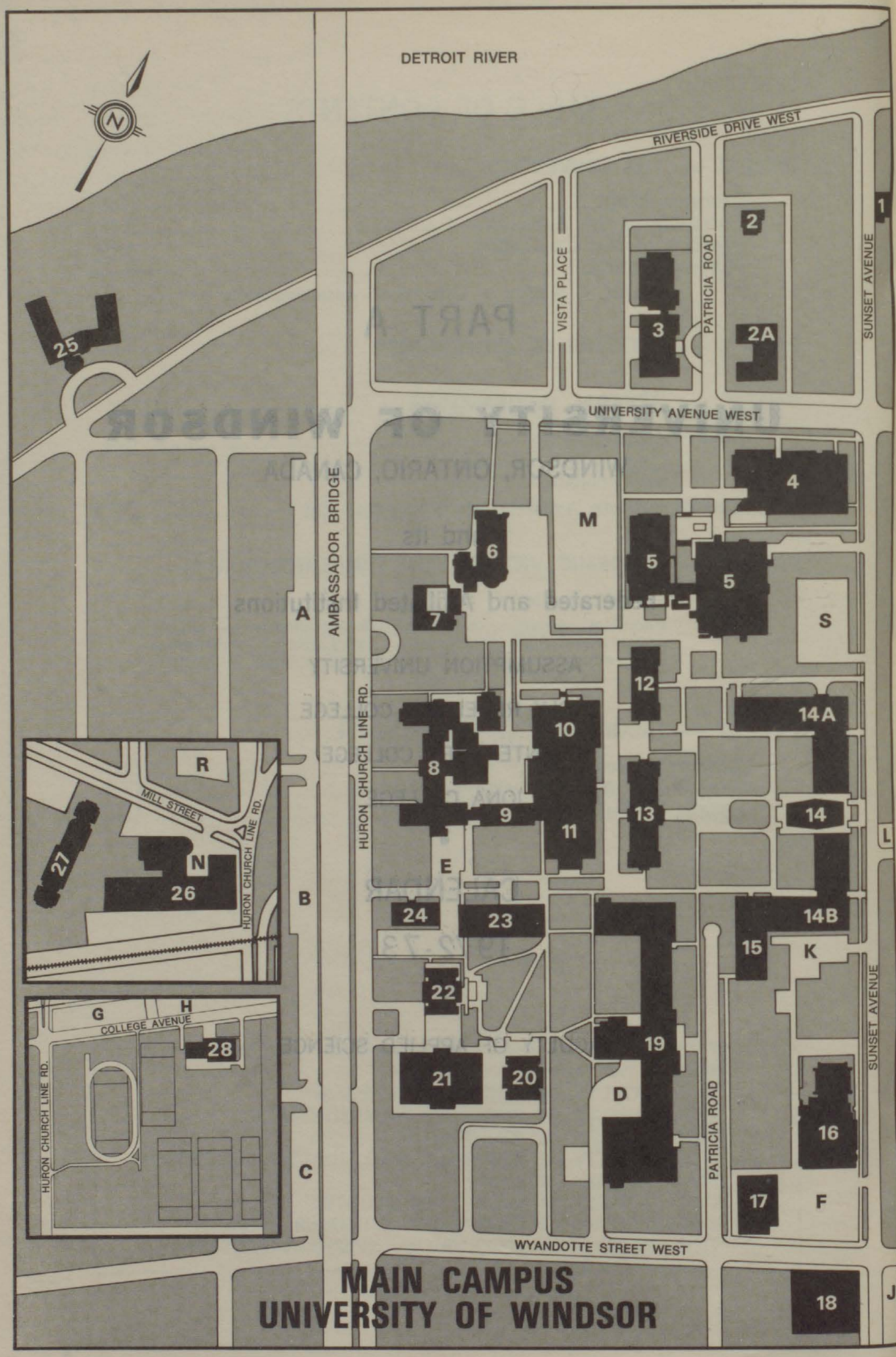
FACULTY OF APPLIED SCIENCE


DETROIT RIVER
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VISTA PLACE
PATRICIA ROAD
SUNSET AVENUE
UNIVERSITY AVENUE WEST
AMBASSADOR BRIDGE
HURON CHURCH LINE RD.
MILL STREET
COLLEGE AVENUE
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MAIN CAMPUS
UNIVERSITY OF WINDSOR

MAIN CAMPUS–UNIVERSITY OF WINDSOR

1. Iona College (1969)
2. Canterbury College (1957)
   (a) Geoffrey Fisher Hall (1967)
   (Married Students and Faculty Residence)
3. Electa Hall (Residence; 1938; 1963)
4. Faculty of Law (1970)
5. University Library (1958)
6. Assumption Church (1728; 1874)
7. Assumption Church Rectory
8. Assumption University (1857)
9. St. Michael's Hall (Residence; 1915; 1960)
10. University Centre (1962)
11. St. Denis Hall (Gymnasium; 1915; 1948)
12. Memorial Hall (Closed-Circuit TV, 1948; 1966)
13. Dillon Hall (Classrooms; 1928; 1957)
14. Windsor Hall (Administration Tower; 1965)
    (a) North Academic Wing (1965)
    (b) South Academic Wing (1967)
15. Biology Building (1966)
16. Mathematics Building (1971)
17. Fine Arts Building (1951; 1966)
18. Music Building
19. Essex Hall (Engineering, Chemistry, Physics, Computer Centre; 1961; 1964)
20. Sir Wilfrid Laurier Hall (Residence; 1969)
21. Vanier Hall (Student Centre; 1969)
22. Sir John A. Macdonald Hall (Residence; 1967)
23. Cody Hall (Residence; 1962)
24. The Shipping Annex
25. The Centre for the Study of Man
26. Huron Hall (residence; 1968)
27. Tecumseh Hall (residence; 1971)
28. Faculty of Physical and Health Education
    Track and Athletic Field (1966)
    Classrooms, Laboratories, Swimming Pool (1968)

Not Shown:
Holy Redeemer College
(National Redemptorist Seminary; 1958; on Highway 3)

Faculty of Education (600 Third Concession)

*Where more than one date is given, the first refers to original construction, and the second to later renovation, addition or assignment.

THE UNIVERSITY OF WINDSOR

is a full member of
The University Matriculation Board of Ontario
The Association of Universities and Colleges of Canada
The Association of Commonwealth Universities
The International Association of Universities

1972

JANUARY

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1973

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CALENDAR OF THE ACADEMIC YEAR

1972

May 1—Recommended final date for application for admission to First Year Law.

May 5—Last date for registration without penalty for Intersession and Summer Night Session.

May 15—Intersession and Summer Night Session begin.

May 17—Last date for late registration and change of course for Intersession and Summer Night Session.

May 19—Graduation assembly for Faculty of Education

May 20—Spring Convocation for all Faculties except Law and Graduate Studies.

May 22—(Monday) Observance of Victoria Day (statutory holiday). Intersession classes as usual.

May 29—Last day for drama auditions.

June 3—Spring Convocation for Faculties of Law and Graduate Studies.

June 23—Last date for registration without penalty for Summer Session.

June 26-August 18—Graduate Summer Session for Faculty of Physical and Health Education.

June 28— Last date for application for supplemental examinations.

July 1—(Saturday) Dominion Day (statutory holiday).

July 3-August 12—Summer Session.

July 5—Last day for Summer Session late registration and change of course.

July 19, 20, 21—Supplemental examinations for second semester and full year courses.

August 7—(Monday) Civic Holiday (statutory holiday). Summer session classes as usual.

August 15—Last date of application for Fall term, Extension Division.

August 28—Registration in person for Fall term, Faculty of Law.

August 29—Classes begin in Faculty of Law.

September 1—Last day for submitting Ph.D. dissertations to Departments for Fall graduation. Last day for registration by mail for Fall term, Extension Division.

September 2—Classes begin in the Faculty of Physical and Health Education for students selecting PHE 461a as an option. Late registration penalty begins for undergraduate evening courses.

September 4—(Monday) Labour Day (statutory holiday).

September 5-11—Observation week for the Faculty of Education; each student must spend this week in an elementary school of his choice if this has not been done during May and June, 1972.

September 7, 8, 9—Day division registration in person, or confirmation in person for those who have pre-registered, as follows: September 7, for all local new undergraduate students in the Faculties of Arts and Science and Business Administration; September 8, for all out-of-town new undergraduate students in the Faculties of Arts and Science and

Business Administration, and all undergraduate students in the Faculty of Applied Science, and School of Computer Science; for all undergraduate and graduate students in the Faculty of Physical and Health Education; September 8 and 9, for all returning undergraduate students in the Faculties of Arts and Science and Business Administration; September 9, for all students in the Faculty of Graduate Studies. (Counselling for graduate students will be held on September 8).

September 8—Late registration penalty begins for undergraduate evening division. Last day for submitting Master's theses to Departments for Fall graduation.

September 11—Classes begin, day and evening, in all Faculties except Law and Education.

September 12—Registration in person in the Faculty of Education.

September 13—Classes begin in the Faculty of Education.

September 15—Last day for oral presentation of theses and dissertations for Fall graduation.

September 25—Field work begins, School of Social Work.

October 2—Last day of late registration for Fall session, day and evening.

October 7—Fall Convocation.

October 9—(Monday) Thanksgiving Day (no classes).

October 13-20—First session continuous teaching, Faculty of Education.

November 3-10—Second session continuous teaching, Faculty of Education.

November 24-December 1—Third session continuous teaching, Faculty of Education.

December 11—Last day of first semester classes in all except Law and Graduate Social Work.

December 12-14—Study period.

December 13—Last day of first semester classes in Faculty of Law.

December 14—First semester examinations begin in Faculties of Law and Education.

December 15—First term field work and graduate classes end, in Social Work. First semester exams begin in all Faculties except Law and Education.

December 25—(Monday) Christmas Day (statutory holiday).

1973

January 1—(Monday) New Year's Day (statutory holiday).

January 2—Second semester classes begin for all faculties except Law. Second term field work begins in School of Social Work.

January 4—Second semester late registration penalty for evening division begins.

January 8—Second semester begins in Faculty of Law.

January 19 - February 2—Fourth session continuous teaching, Faculty of Education.

January 22—Last day of registration for second semester courses, day and evening.

February 19-23 inclusive—Midyear recess for all Faculties except Education.

February 23 - March 2—Fifth session continuous teaching, Faculty of Education.

March 19-23—Mid-winter recess for Faculty of Education.

April 9—Last day of classes, day and evening, except in Law and Graduate Social Work.

April 10-13 inclusive—Study period.

April 13—School of Social Work graduate classes end.

April 14—Spring final examinations begin, for all faculties except Law.

April 18—Last day for submitting Ph.D. dissertations to Departments for Spring graduation.

April 20—Good Friday (statutory holiday)

April 22—Easter Sunday.

April 23-27—Final examinations in Faculty of Education.

April 25—Last day for submitting Master's theses to Departments for Spring graduation.

April 27—Last day of lectures in Faculty of Law. Second term field work ends in Social Work.

April 27 - May 11—Final session continuous teaching, Faculty of Education.

April 30—Second semester examinations begin in Faculty of Law.

May 11—Last day for oral presentation of theses and dissertations for Spring graduation.

May 13—Last day for drama auditions.

May 14—Intersession begins.

May 19—Spring Convocation for all Faculties except Law and Graduate Studies.

May 21—(Monday) Observance of Victoria Day (statutory holiday).

June 2—Spring Convocation for Faculties of Law and Graduate Studies.

July 1—(Sunday) Dominion Day (statutory holiday).

July 2 - August 11—Summer Session.

****

Final Dates for dropping courses without grade assignment, are as follows:

Intersession (full course)—3 weeks after the class begins.

Intersession (half course)—10 days after the class begins.

Evening Summer Session (course of 12 weeks)—6 weeks after the class begins.

Summer Session (full course)—3 weeks after the class begins.

Summer Session (half course)—10 days after the class begins.

Winter Session (full year course)—January 15.

Winter Session (first semester course)—November 1.

Winter Session (second semester course)—February 15.

HISTORY OF THE UNIVERSITY OF WINDSOR

On July 1, 1963, the new, non-denominational University of Windsor inherited an educational comples founded in 1857 as Assumption College, developed since 1870 by the Basilian Fathers (the Congregation of St. Basil), and expanded to independent University status in 1953. The transition from an historic Roman Catholic university to a non-denominational institution was unprecedented.

The new institution included Assumption University as a federated member, operating residences on campus for men and women and holding in abeyance its degree-granting powers except in the graduate Faculty of Theology. All of the facilities and teaching faculty of Assumption University were absorbed in the University of Windsor, as were those of its federated, non-denominational Essex College, which ceased to exist.

Heritage

Assumption College opened its doors on February 10, 1857, largely through the efforts of Rev. Pierre Point, S.J., pastor of Assumption Parish in Sandwich, established as a mission in 1748 and made a parish in 1767, the oldest in Canada west of Montreal. M. Theodule Girardot was the first instructor. The College was incorporated by an Act of the Legislature of the Province of Canada which received Royal Assent August 16, 1858, during the Superiorship of Rev. Joseph Malbos, a Basilian who guided it for one year. Successively, the College was directed by Jesuits, Benedictines and secular clergy until the Basilians returned in 1870.

During the early years, the curriculum consisted of classical and commercial courses providing a complete high school and Arts course, primarily designed to prepare students for theological seminaries, although many alumni entered business and professional spheres. In 1919, Assumption affiliated with Western University, London, Ontario (now the University of Western Ontario), as an integral part of the latter's Faculty of Arts and Science with a broadened curriculum including General and Honours Courses in Arts and Science leading to Bachelor of Arts and Bachelor of Science degrees, graduate work in Philosophy leading to the Master of Arts degree, and pre-professional programs such as pre-engineering, pre-medicine and pre-law.

From 1934 to 1962, Holy Names College, conducted by the Sisters of the Holy Names of Jesus and Mary, enabled Assumption to become co-educational. Then the Sisters disbanded the College, while continuing to teach at the University, and Assumption took over its women's residence which was re-named Electa Hall.

University Development

On July 1, 1953, Assumption College ended its affiliation with the University of Western Ontario and obtained its own university powers through an Act of the Ontario Legislature. In 1954 it was admitted to full membership in the National Conference of Canadian Universities and Colleges, to the University Matriculation Board of Ontario, and to the Association of Universities of the British Commonwealth.

In 1956, the College changed its name to Assumption University by an Act of the Ontario Legislature and accepted as an affiliate the non-denominational Essex College, incorporated in 1954, which assumed responsibility for the Faculty of Applied Science, the Schools of Business Administration and Nursing, and the Departments of Biology, Chemistry, Geology and Geography,

Mathematics, and Physics. Holy Redeemer College, national seminary of the Redemptorist Fathers, located three miles off campus, also affiliated. In 1957, Canterbury College, offering courses in Philosopy, Religious Knowledge and Medieval History, became the first Anglican college in the world to affiliate with a Roman Catholic university.

Recent Expansion

The University of Windsor was incorporated by the Ontario Legislature on December 19, 1962, accepting Assumption University in federation. During 1963 and 1964, affiliation agreements were made with Holy Redeemer College, Canterbury College and the new Iona College (United Church of Canada), the latter two planning to sponsor student residences and chaplains. A notable innovation in 1963-64 was the establishment of an inter-denominational, undergraduate Department of Theology, now offering courses in three theologies (Anglican, Roman Catholic and United Church), but available to others as the need arises.

The University of Windsor assumed control of the campus on July 1, 1963, and became a member of the International Association of Universities in June, 1964. Rev. E. C. LeBel, C.S.B., first President and Vice-Chancellor of the University of Windsor, was succeeded on July 1, 1964, by Dr. J. F. Leddy, who had been Vice-President (Academic) of the University of Saskatchewan.

The Faculty of Education (formerly Windsor Teachers College) became a part of the University in July, 1970.

The Interfaculty Department of Computer Science was raised to the status of autonomous School of Computer Science in 1970. The Faculty of Law building, the Library addition and the Mathermatics Building have been completed.

Presidents: 1963-64: Rev. Eugene Carlisle LeBel, C.S.B., C.D., LL.D.
1964- : John Francis Leddy, D.Phil., D.Litt., D.es L., LL.D., D.C.L.

SUMMARY OF REGISTRATION, 1971-72

Regular Winter Session	**Men**	**Women**	**Total**
Arts	1464	1035	2499
Science	382	95	477
Dramatic Art	28	23	51
Fine Art	56	47	103
Music	33	19	52
Nursing	6	210	216
Social Work	80	159	239
Physical and Health Education	101	81	182
Applied Science	342	0	342
Commerce	594	33	627
Computer Science	48	13	61
Education	88	97	185
Law	300	18	318
Graduate Studies	402	85	487
Full Time Day (total)	3924	1915	5839
Part Time—Day and Evening (total)	1531	1572	3103
Intersession and Summer Session 1971			3962
			12904

THE COAT-OF-ARMS

The form of the Letters Patent, issued in 1963 by Garter, Clarenceux and Norroy-and-Ulster Kings of Arms in granting the armorial bearings, was the first of its kind in the history of armory, using the style and title of Her Majesty Queen Elizabeth II as Queen of Canada and placing Her Royal Arms of Canada in the centre rather than the traditional Royal Arms of British sovereigns as monarchs of Britain.

Gold and blue, the colors of the University of Windsor, predominate in the bearings. Gold and green had been the colors of the former Essex College, which was absorbed by the new University. Blue, gold and white are the colors of Assumption University, now federated with the University of Windsor.

The Shield of Arms consists of a gold background on which are three piles, or wedgeshaped heraldic charges, emphasizing the Christian origin of the University, as well as the arduous nature of academic endeavour.

Each pile carries an armorial charge: the upper two a Maple Leaf and Fleur-de-Lis, both gold, alluding to the historic nature of the seat of the University and the nationalities of the major population groups in Windsor. The lower pile is charged with a silver lily with gold wings, a device taken from the arms of Assumption University.

Over the whole of the shield stretches a symbolic bridge with twin allusions to the location of the University at the Canadian base of the Ambassador Bridge linking Canada and the United States, Windsor and Detroit, and to the principal aims of the university—to bridge chasms of ignorance and join the firm grounds of truth.

Above the shield is the Helm of the corporation, a closed steel vizor lined with red silk. From the Helm rises the Crest, consisting of a Black Greek Cross recalling the association of the Basilian Fathers (the Congregation of St. Basil) with Assumption almost since its founding in 1857.

The Cross stands in front of two red Seaxes, or notched swords, as a cant (or pun) on Essex, the County in which the University is located. The composition is irradiated with gold rays as a further allusion to the County, the "Sun Parlor of Canada." Around the base of the Crest is a Wreath of the University of Windsor colors, blue and gold, and from this, down on either side of the Helm, flows the mantling of the same colors.

The gold Supporters on either side of the Shield are a Canadian Deer and a Moose, alluding to the Supporters of the Arms of Ontario and the derivation of the University's academic authority and principal financial support from the Provincial Legislature, but reversed from those of Ontario. The head of each Supporter is placed in the position known as "guardant," that is, looking toward the viewer, forward-looking.

The whole composition is placed on a green mound, or Compartment, at the base of which is the Motto Scroll, inscribed, "BONITATEM, DISCIPLINAM, SCIENTIAM", words taken from a latin version of Psalm (118) (119)—"Goodness, Discipline and Knowledge."

UNIVERSITY OF WINDSOR

Telephone: (519)253-4232

BOARD OF GOVERNORS (as of January 1, 1972)

Member ex officio:

J. Francis Leddy, D.Phil., D. Litt., D.es L., LL.D., D.C.L., **Vice-Chancellor and President**

Eected Members:

F. Stanley Arbour
Brigadier W. W. Bradley, C.D., A.D.C., **Vice-Chairman**
George Burt, LL.D.
J. Robert Calcott, B.A.
William A. Cowan, Q.C.
Mrs. F. M. Dunlop, B.A.
Rev. D'Arcy L. Egan, C.Ss.R., S.T.L.
Martin Goldberg, B.A.
Benjamin Luborsky, M.D., L.M.C.C., M.C.F.R., F.A.S.A.S.
Walter L. McGregor, Q.C., LL.D.
Robert W. Meanwell, B.A., F.C.A., LL.D.
James R. Moore, B.Sc., M.A.
Frederick R. Palin, F.C.A.
Edwin R. Rowzee, M.Ch.E., D.Sc.
Robert J. Tebbs, B.A.

Members Appointed by Assumption University:

Rev. J. F. Callaghan, C.S.B., M.A.
Charles J. Clark, Q.C., LL.D., **Chairman**
Rev. J. R. Dougherty, C.S.B., M.S.
Rev. A. R. Howell, C.S.B., M.A.Sc.
Rev. Eugene R. Malley, C.S.B., S.T.D.
His Honour Judge Joseph P. McMahon, B.A., Q.C.

Members Appointed by the Alumni Association:

Armando F. A. DeLuca, B.A., LL.B.
Leon Z. McPherson, Q.C.

Members Appointed by the Lieutenant Governor in Council:

A. E. Caza
Mrs. Letitia Graybiel, B.Comm.
John C. Judge, B.A., M.Ed.
Hugh McConville

Members Appointed by the Senate:

J. Maxwell Brownlie, B.A., M.B.A.
Alex W. Gnyp, B.A.Sc., M.A.Sc., Ph.D.
Byron P. Rourke, B.A., M.A., Ph.D.
Walter S. Tarnopolsky, B.A., LL.B., A.M., LL.M.

ASSUMPTION UNIVERSITY

Federated with the University of Windsor

Rev. Eugene R. Malley, C.S.B., S.T.D., **President**
Rev. John F. Murphy, C.S.B., Ph.D., **Chaplain**

BOARD OF GOVERNORS

Rev. E. R. Malley, C.S.B., S.T.D., **President and Superior**
Rev. A. R. Howell, C.S.B., M.A.Sc., **Treasurer**
Rev. J. F. Callaghan, C.S.B., M.A.
Rev. C. P. Crowley, C.S.B., Ph.D.
Rev. J. R. Dougherty, C.S.B., M.A.
Rev. J. P. O'Meara, C.S.B., Ph.D.
Rev. R. S. Pazik, C.S.B., Cert. Est del Doct.

HOLY REDEEMER COLLEGE

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Patricia R. Lauzon (Mrs. R. J.).

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Beeton, Elizabeth (Mrs.); B.A. (York), B.L.S. (McGill).
Head, Bibliographic Searching Department.

Breuer, Otto Z.; B.A. (British Columbia), M.L.S. (Washington).
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Pakauskas, Milda; B.A. (Windsor), B.L.S. (Toronto).
Reference Librarian.

Ramachandran, Munuswamy T.; B.A., Dipl. L.S. (Madras), M.L.S. (Hawaii).
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Catalogue Librarian.

Reitz, Conrad H.; B.A. (Pretoria), Lib. Dip. (Cape Town), M.L.S. (Toronto).
Assistant Librarian for Technical Services.

Son, Kyung Whan; B.A. (Seoul National Univ., Korea), A.M. (Michigan), B.L.S. (British Columbia). Catalogue Librarian.

Spence, Harold A.; B.A. (Saskatchewan), B.L.S. (British Columbia).
Reference Librarian.

Stoehr, Frederick R.; M.A. (Columbia), M.A. (Detroit), B.S.Ed. (Fordham), B.A.L.S. (Rosary). Coordinator of Library Orientation.

Venkateswarlu, Tadiboyina; B.A., M.A. (Andhra), M.Sc. (Alberta), M.L.S. (Western Ontario). Reference Librarian.

Ward, R. Keith; B.A. (Mount Allison), M.A. (Windsor), A.M.L.S. (Michigan).
Head, Acquisitions Department.

Williamson, Elizabeth J.; B.A., B.L.S. (Toronto).
Head, Cataloguing Department.

Winter, Frank H.; B.A.. B.L.S. (British Columbia).
Government Documents Librarian.

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Interlibrary Loans Librarian.

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Boen, Daniel K.L.; LL.M. (Indonesia), M.L.S. (Western Ontario).
Catalogue Librarian.

Craig, Barbara L.; A.R.C.T. (Toronto), B.A. (Assumption), M.S.L.S. (Wayne State).
Head, Technical Services Department.

Murphy, Paul T.; B.A., LL.B. (Windsor).
Acting head, Reader Services Department.

Soong, Huey-Min; B.A. (National Taiwan), M.L.S. (Oklahoma).
Reference Librarian.

OFFICERS OF INSTRUCTION

(The year of first appointment is given).

FULL TIME

Abdel-Sayed, George; B.Sc., M.Sc. (Cairo), Dr. Ing. (T.U. Karlsruhe). Associate Professor of Civil Engineering—1967.

Abraham, Puthenvilla Y.; B.Sc.N. (Alberta), M.P.H. (Michigan), Reg. N. Assistant Professor of Nursing—1971.

Adelman, Maurice; B.A.Sc., Ph.D. (Toronto). Associate Dean of Graduate Studies; Professor and Head, Department of Chemical Engineering—1956.

Adorni, Sergio; Laurea (Siena), M.A. (Wisconsin). Assistant Professor of Hispanic and Italian Studies—1970.

*Akeley, Rev. T. C., O.G.S.; B.A. (Johns Hopkins), L. Th., B.D. (Seabury-Western Theol. Sem.), Ph.D. (Cantab). Associate Professor of Theology—1965.

Alexander, Philip; B.A.Sc. (Assumption), M.A.Sc. (Windsor). Assistant Professor of Electrical Engineering—1964.

Amore, Roy C.; A.B. (Ohio), B.D. (Drew), Ph.D. (Columbia). Assistant Professor of Theology—1970.

Ansley, Clive; B.A., M.A. (British Columbia). Assistant Professor of Asian Studies—1968.

Arison, William Henry; B.Sc. (Toronto), M.B.A. (Windsor). Assistant Professor of Business Administration—1970.

Atkinson, Colin B.; B.Eng. (McGill), B.A. (Sir George Williams), M.A. (Columbia), Ph.D. (New York U.). Assistant Professor of English—1971.

Atkinson, Harold R.; B.Sc. (Western Ontario), M.Sc. (Assumption), Ph.D. (Queen's). Associate Professor of Mathematics—1964.

Auld, Frank; B.A. (Drew), M.A., Ph.D. (Yale). Professor of Psychology—1970.

Bailey, Roger Glyn; LL.B. (Auckland), LL.M. (Melbourne), Barrister and Solicitor of the Supreme Courts of New Zealand and Fiji. Associate Professor of Law—1971.

Balance, William D.; B.A. (Birmingham Southern College), Ph.D. (Alabama). Associate Professor of Psychology—1968.

Banerjee, Sourendra Kumar; B.Sc., M.Sc. (Patna U.), Ph.D. (Toronto). Associate Professor of Mathematics—1969.

Barnes, John; B.A., M.S.W. (Toronto), D.S.W. (Pennsylvania). Associate Professor of Social Work—1968.

Barnett, Donald F.; B.A. (Carleton), M.A., Ph.D. (Queen's). Assistant Professor of Economics—1968.

Basic, E. Martin; B.S.E.E., B.S.M.E. (Illinois Inst. of Technology), M.B.A. (Western Michigan), Ph.D. (Michigan State), P.Eng. (Ontario). Professor of Business Administration—1965.

Batra, Carol D. (Mrs.); B.Sc.N. (Toronto), M.Ed. (Columbia), Reg.N. Assistant Professor of Nursing—1968.

*On leave.

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Benedict, Winfred Gerald; M.Phil. (Leeds), B.S.A., Ph.D. (Toronto). Professor of Biology—1957.

Benson, Jane (Mrs.); L.G.S.M. (Guildhall). Assistant Professor of Dramatic Art—1969.

Bertman, Stephen; B.A. (New York), M.A. (Brandeis), Ph.D. (Columbia). Associate Professor of Classical Studies—1967.

Bewtra, Jatinder K.; B.E. (Roorkee), M.S., Ph.D. (Iowa). Associate Professor of Civil Engineering—1968.

Billinghurst, Robert Gordon; B.A.Sc., M.A.Sc. (Toronto). Assistant Dean of Applied Science and Professor of Engineering Materials—1957.

Birch, Cecil Mackintosh; B.A. (Western Ontario), M.A., Ph.D. (Toronto). Professor of Business Administration—1959.

Bird, Harold W.; B.A., Dipl.Ed., M.A. (Cambridge), M.A. (McMaster). Associate Professor of Classical Studies—1969.

*Black, Paul J.; B.A., M.A. (Windsor). Assistant Professor of English—1966.

Blackbourn, Anthony; B.Sc. (London), M.A. (Georgia), Ph.D. (Toronto). Associate Professor of Geography—1963.

Blair, John A.; B.A. (McGill). Assistant Professor of Philosophy—1967.

Blair, Mansell John; B.A., S.T.B. (Assumption), Ph.D. (Notre Dame). Assistant Professor of Sociology—1968.

Boles, Daniel; B.A. (Stanford), M.F.A. (Tulane). Assistant Professor of Fine Arts—1969.

Bolus, C. Robert; B.Sc., M.Ed. (Wayne State). Assistant Professor of Education—1967.

Booth, David; B.A. (Chicago), M.A. (Illinois), Ph.D. (Northwestern). Associate Professor of Sociology—1970.

*Bounsall, E. J.; B.A.Sc., (Chem. Eng.), M.A. (Toronto), Ph.D. (Imperial College, London). Associate Professor of Chemistry—1965.

Brazel, Anthony J.; B.A., M.A. (Rutgers). Assistant Professor of Geography—1969.

Breaugh, Joseph B.; B.S., M.A. (Central Michigan). Assistant Professor of Sociology—1970.

Briggs, Elsworth Donald; B.A. (New Brunswick), Ph.D. (London). Vice-Dean, Division of Social Sciences; Associate Professor of Political Science—1963.

Bringmann, Wolfgang G.; B.S. (Darmstadt), M.A., Ph.D. (Alabama). Professor of Psychology—1967.

Britten, Daniel J.; B.A. (Merrimack College), M.S., Ph.D. (Iowa). Assistant Professor of Mathematics—1971.

Broad, George A.; B.A. (Windsor), B.Ed. (Toronto). Assistant Professor of Education—1961.

Brown, Alan Andrew; B.A. (City U. of New York), M.A., Ph.D. (Harvard). Professor of Economics—1971.

*On leave.

Brown, Jerome V.; B.A. (Iona College, N.Y.), M.A., Ph.D. (Toronto). Associate Professor of Philosophy—1961.

Brown, Raymond E.; B.A. (Seattle), LL.B. (Washington); Member of the Washington Bar. Professor of Law—1968.

Brown-John, C. Lloyd; B.A. (British Columbia), M.A., Ph.D. (Toronto). Assistant Professor of Political Science—1968.

Brownlie, J. Maxwell; B.A. (Western Ontario), M.B.A. (Michigan). Professor of Business Administration—1958.

*Buck, Margaret A.; Lecturer in Education—1958.

Buckley, Lola E.; B.B.A. (Houston), M.S.W. (Denver), D.S.W. (Southern California). Associate Professor of Social Work—1970.

Bunt, Miriam Elizabeth; B.A., B.S., M.Ed., Ph.D. (Wayne State). Professor and Head, Department of Psychology—1963.

Burrell, Peter R.; B.A. (Assumption), M.A. (Pennsylvania). Associate Professor of Economics—1965.

*Burton, Bruce Edward; M.A. (Oxon.), M.Soc.Sc. (Hague). Associate Professor of Political Science—1966.

*Callaghan, Rev. John Francis, C.S.B.; B.A., M.A. (Toronto). Associate Professor of Economics—1957.

Caron, Marie-Therese; B.A. (Ottawa), M.A. (Laval), Ph.D. (Wisconsin). Associate Professor of French Language and Literature—1964.

Carson, B. F.; B.A. (Windsor). Assistant Professor of Education—1967.

Carter, David Thomas; B.Comm., M.B.A. (Windsor), C.A. Assistant Professor of Business Administration—1970.

Cassano, Paul; B.A. (Windsor), M.A. (New York), Ph.D. (Columbia). Associate Professor of French Language and Literature—1968.

Cervin, Vladimir Bohdan; B.A., B.Sc. (Vienna, Austria), D.S.S. (Brussels), Ph.D. (Prague). Professor of Psychology—1961.

Chabot, Marcel Eugene; B.A. (Windsor), A.M., Ph.D. (Harvard). Assistant Professor of French Language and Literature—1970.

* Chandler, Robert; B.A., B.S.W., M.S.W. (Toronto). Assistant Professor of Social Work—1968.

Chandna, Om Parkash; B.A. (Panjab), M.A. (Delhi), M.Sc., Ph.D. (Windsor). Associate Professor of Mathematics—1968.

Channen, Eric Wyllis; B.A. (Hons), Ph.D. (Toronto). Professor and Director, School of Computer Science—1960.

Chee, Sek Por; B.C.E. (Melbourne), Ph.D. (Aberdeen). Associate Professor of Civil Engineering—1967.

Chrypinski, Vincent Casmere; M.L. (Catholic U. of Lublin, Poland), M.A. (Wayne), Ph.D. (Michigan). Professor of Political Science—1957.

*On leave.

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Clarke, Harold Dowler; B.A., M.A. (Western Ontario), Ph.D. (Duke). Assistant Professor of Political Science—1971.

Clarke, James P.; A.B., M.S. (Columbia), Ph.D. (New York). Associate Professor of Social Work—1969.

Claxton, John D.; B.Sc. (Saskatchewan), M.B.A., Ph.D. (Western Ontario). Assistant Professor of Business Administration—1971.

Cohen, Jerome S.; B.A. (Michigan State), M.A., Ph.D. (Wayne State). Assistant Professor of Psychology—1968.

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Crowley, Rev. Cornelius Patrick Joseph, C.S.B.; B.A. (Toronto), M.A., Ph.D. (Michigan); Dean of Graduate Studies, Professor of English—1944.

Crowley, Rev. Edward J., C.Ss.R.; B.A. (St. Joseph's, New Brunswick), S.T.L. (Catholic U. of America), S.S.L. (Pontifical Biblical Institute, Rome). Professor and Head, Department of Theology—1957.

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Culliton, Rev. Joseph Thomas, C.S.B.; B.A., B.Ed. (Toronto), S.T.B., M.A. (U. of St. Michael's College), Ph.D. (Fordham). Assistant Professor of Theology—1965.

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Czajkowski, M; M.Sc. (Nicholas Copernicus), D.Sc. (Torun, Poland). Associate Professor of Physics—1967.

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Danish, Ali Asghar; B.Sc. (Southern California), M.Sc. (Cornell), M.Sc. in Ind. Engr. (Georgia Inst. of Tech.). Associate Professor of Industrial Engineering—1967.

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Della Valle, Philip A.; B.A. (Windsor), M.A. (Toronto), Ph.D. (State U. of New York). Associate Professor of Economics—1968.

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Holland, Cornelius J.; B.S. (St. Joseph's, Philadelphia), M.A. (Detroit), Ph.D. (Catholic U. of America). Associate Professor of Psychology—1967.

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Hrycay, Rudolph; B.A., M.A. (Saskatchewan) Ph.D. (Alberta). Assistant Professor of Mathematics—1969.

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*On leave.

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Wolfe, Martha F. (Mrs.); A.B. (Emmanuel College, Boston), M.L.S. (Pittsburgh).
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Zolobka, Vincent; M.A., B.L.S. (Ottawa), A.M.L.S. (Michigan).
Interlibrary Loans Librarian.

LAW LIBRARY STAFF

Jacobs, Roger F.; A.B., J.D. (Detroit), A.M.L.S. (Michigan).
Law Librarian.

Boen, Daniel K.L.; LL.M. (Indonesia), M.L.S. (Western Ontario).
Catalogue Librarian.

Craig, Barbara L.; A.R.C.T. (Toronto), B.A. (Assumption), M.S.L.S. (Wayne State).
Head, Technical Services Department.

Murphy, Paul T.; B.A., LL.B. (Windsor).
Acting head, Reader Services Department.

Soong, Huey-Min; B.A. (National Taiwan), M.L.S. (Oklahoma).
Reference Librarian.

OFFICERS OF INSTRUCTION

(The year of first appointment is given).

FULL TIME

Abdel-Sayed, George; B.Sc., M.Sc. (Cairo), Dr. Ing. (T.U. Karlsruhe). Associate Professor of Civil Engineering—1967.

Abraham, Puthenvilla Y.; B.Sc.N. (Alberta), M.P.H. (Michigan), Reg. N. Assistant Professor of Nursing—1971.

Adelman, Maurice; B.A.Sc., Ph.D. (Toronto). Associate Dean of Graduate Studies; Professor and Head, Department of Chemical Engineering—1956.

Adorni, Sergio; Laurea (Siena), M.A. (Wisconsin). Assistant Professor of Hispanic and Italian Studies—1970.

*Akeley, Rev. T. C., O.G.S.; B.A. (Johns Hopkins), L. Th., B.D. (Seabury-Western Theol. Sem.), Ph.D. (Cantab). Associate Professor of Theology—1965.

Alexander, Philip; B.A.Sc. (Assumption), M.A.Sc. (Windsor). Assistant Professor of Electrical Engineering—1964.

Amore, Roy C.; A.B. (Ohio), B.D. (Drew), Ph.D. (Columbia). Assistant Professor of Theology—1970.

Ansley, Clive; B.A., M.A. (British Columbia). Assistant Professor of Asian Studies—1968.

Arison, William Henry; B.Sc. (Toronto), M.B.A. (Windsor). Assistant Professor of Business Administration—1970.

Atkinson, Colin B.; B.Eng. (McGill), B.A. (Sir George Williams), M.A. (Columbia), Ph.D. (New York U.). Assistant Professor of English—1971.

Atkinson, Harold R.; B.Sc. (Western Ontario), M.Sc. (Assumption), Ph.D. (Queen's). Associate Professor of Mathematics—1964.

Auld, Frank; B.A. (Drew), M.A., Ph.D. (Yale). Professor of Psychology—1970.

Bailey, Roger Glyn; LL.B. (Auckland), LL.M. (Melbourne), Barrister and Solicitor of the Supreme Courts of New Zealand and Fiji. Associate Professor of Law—1971.

Balance, William D.; B.A. (Birmingham Southern College), Ph.D. (Alabama). Associate Professor of Psychology—1968.

Banerjee, Sourendra Kumar; B.Sc., M.Sc. (Patna U.), Ph.D. (Toronto). Associate Professor of Mathematics—1969.

Barnes, John; B.A., M.S.W. (Toronto), D.S.W. (Pennsylvania). Associate Professor of Social Work—1968.

Barnett, Donald F.; B.A. (Carleton), M.A., Ph.D. (Queen's). Assistant Professor of Economics—1968.

Basic, E. Martin; B.S.E.E., B.S.M.E. (Illinois Inst. of Technology), M.B.A. (Western Michigan), Ph.D. (Michigan State), P.Eng. (Ontario). Professor of Business Administration—1965.

Batra, Carol D. (Mrs.); B.Sc.N. (Toronto), M.Ed. (Columbia), Reg.N. Assistant Professor of Nursing—1968.

*On leave.

Officers of Instruction

Baylis, William Eric; B.S. (Duke), M.S. (Illinois), D.Sc. (Technical Univ. of Munich). Associate Professor of Physics—1969.

Benedict, Winfred Gerald; M.Phil. (Leeds), B.S.A., Ph.D. (Toronto). Professor of Biology—1957.

Benson, Jane (Mrs.); L.G.S.M. (Guildhall). Assistant Professor of Dramatic Art—1969.

Bertman, Stephen; B.A. (New York), M.A. (Brandeis), Ph.D. (Columbia). Associate Professor of Classical Studies—1967.

Bewtra, Jatinder K.; B.E. (Roorkee), M.S., Ph.D. (Iowa). Associate Professor of Civil Engineering—1968.

Billinghurst, Robert Gordon; B.A.Sc., M.A.Sc. (Toronto). Assistant Dean of Applied Science and Professor of Engineering Materials—1957.

Birch, Cecil Mackintosh; B.A. (Western Ontario), M.A., Ph.D. (Toronto). Professor of Business Administration—1959.

Bird, Harold W.; B.A., Dipl.Ed., M.A. (Cambridge), M.A. (McMaster). Associate Professor of Classical Studies—1969.

*Black, Paul J.; B.A., M.A. (Windsor). Assistant Professor of English—1966.

Blackbourn, Anthony; B.Sc. (London), M.A. (Georgia), Ph.D. (Toronto). Associate Professor of Geography—1963.

Blair, John A.; B.A. (McGill). Assistant Professor of Philosophy—1967.

Blair, Mansell John; B.A., S.T.B. (Assumption), Ph.D. (Notre Dame). Assistant Professor of Sociology—1968.

Boles, Daniel; B.A. (Stanford), M.F.A. (Tulane). Assistant Professor of Fine Arts—1969.

Bolus, C. Robert; B.Sc., M.Ed. (Wayne State). Assistant Professor of Education—1967.

Booth, David; B.A. (Chicago), M.A. (Illinois), Ph.D. (Northwestern). Associate Professor of Sociology—1970.

*Bounsall, E. J.; B.A.Sc., (Chem. Eng.), M.A. (Toronto), Ph.D. (Imperial College, London). Associate Professor of Chemistry—1965.

Brazel, Anthony J.; B.A., M.A. (Rutgers). Assistant Professor of Geography—1969.

Breaugh, Joseph B.; B.S., M.A. (Central Michigan). Assistant Professor of Sociology—1970.

Briggs, Elsworth Donald; B.A. (New Brunswick), Ph.D. (London). Vice-Dean, Division of Social Sciences; Associate Professor of Political Science—1963.

Bringmann, Wolfgang G.; B.S. (Darmstadt), M.A., Ph.D. (Alabama). Professor of Psychology—1967.

Britten, Daniel J.; B.A. (Merrimack College), M.S., Ph.D. (Iowa). Assistant Professor of Mathematics—1971.

Broad, George A.; B.A. (Windsor), B.Ed. (Toronto). Assistant Professor of Education—1961.

Brown, Alan Andrew; B.A. (City U. of New York), M.A., Ph.D. (Harvard). Professor of Economics—1971.

*On leave.

Brown, Jerome V.; B.A. (Iona College, N.Y.), M.A., Ph.D. (Toronto). Associate Professor of Philosophy—1961.

Brown, Raymond E.; B.A. (Seattle), LL.B. (Washington); Member of the Washington Bar. Professor of Law—1968.

Brown-John, C. Lloyd; B.A. (British Columbia), M.A., Ph.D. (Toronto). Assistant Professor of Political Science—1968.

Brownlie, J. Maxwell; B.A. (Western Ontario), M.B.A. (Michigan). Professor of Business Administration—1958.

*Buck, Margaret A.; Lecturer in Education—1958.

Buckley, Lola E.; B.B.A. (Houston), M.S.W. (Denver), D.S.W. (Southern California). Associate Professor of Social Work—1970.

Bunt, Miriam Elizabeth; B.A., B.S., M.Ed., Ph.D. (Wayne State). Professor and Head, Department of Psychology—1963.

Burrell, Peter R.; B.A. (Assumption), M.A. (Pennsylvania). Associate Professor of Economics—1965.

*Burton, Bruce Edward; M.A. (Oxon.), M.Soc.Sc. (Hague). Associate Professor of Political Science—1966.

*Callaghan, Rev. John Francis, C.S.B.; B.A., M.A. (Toronto). Associate Professor of Economics—1957.

Caron, Marie-Therese; B.A. (Ottawa), M.A. (Laval), Ph.D. (Wisconsin). Associate Professor of French Language and Literature—1964.

Carson, B. F.; B.A. (Windsor). Assistant Professor of Education—1967.

Carter, David Thomas; B.Comm., M.B.A. (Windsor), C.A. Assistant Professor of Business Administration—1970.

Cassano, Paul; B.A. (Windsor), M.A. (New York), Ph.D. (Columbia). Associate Professor of French Language and Literature—1968.

Cervin, Vladimir Bohdan; B.A., B.Sc. (Vienna, Austria), D.S.S. (Brussels), Ph.D. (Prague). Professor of Psychology—1961.

Chabot, Marcel Eugene; B.A. (Windsor), A.M., Ph.D. (Harvard). Assistant Professor of French Language and Literature—1970.

* Chandler, Robert; B.A., B.S.W., M.S.W. (Toronto). Assistant Professor of Social Work—1968.

Chandna, Om Parkash; B.A. (Panjab), M.A. (Delhi), M.Sc., Ph.D. (Windsor). Associate Professor of Mathematics—1968.

Channen, Eric Wyllis; B.A. (Hons), Ph.D. (Toronto). Professor and Director, School of Computer Science—1960.

Chee, Sek Por; B.C.E. (Melbourne), Ph.D. (Aberdeen). Associate Professor of Civil Engineering—1967.

Chrypinski, Vincent Casmere; M.L. (Catholic U. of Lublin, Poland), M.A. (Wayne), Ph.D. (Michigan). Professor of Political Science—1957.

*On leave.

Officers of Instruction

Clarke, Harold Dowler; B.A., M.A. (Western Ontario), Ph.D. (Duke). Assistant Professor of Political Science—1971.

Clarke, James P.; A.B., M.S. (Columbia), Ph.D. (New York). Associate Professor of Social Work—1969.

Claxton, John D.; B.Sc. (Saskatchewan), M.B.A., Ph.D. (Western Ontario). Assistant Professor of Business Administration—1971.

Cohen, Jerome S.; B.A. (Michigan State), M.A., Ph.D. (Wayne State). Assistant Professor of Psychology—1968.

Colborne, William George; B.Sc., M.Sc. (Queen's). Professor and Head, Department of Mechanical Engineering—1958.

Cooke, Bernard J.; A.B., M.A., Phil.Lic. (St. Louis), S.T.L. (St. Mary's, Kansas), S.T.D. (Inst. Catholique, Paris). Professor of Theology—1970.

Cowan, Ralph K.; B.A. (Western Ontario), A.M. (Michigan). Professor of Business Administration—1954.

Crowell, George H.; A.B. (Princeton), B.D., Th.D. (Union Theol. Sem.). Associate Professor of Theology—1968.

Crowley, Rev. Cornelius Patrick Joseph, C.S.B.; B.A. (Toronto), M.A., Ph.D. (Michigan); Dean of Graduate Studies, Professor of English—1944.

Crowley, Rev. Edward J., C.Ss.R.; B.A. (St. Joseph's, New Brunswick), S.T.L. (Catholic U. of America), S.S.L. (Pontifical Biblical Institute, Rome). Professor and Head, Department of Theology—1957.

Cruz, Valentin; B.A. (Providence College), B.S.W., M.S.W. (Ottawa). Associate Professor of Social Work—1971.

Culliton, Rev. Joseph Thomas, C.S.B.; B.A., B.Ed. (Toronto), S.T.B., M.A. (U. of St. Michael's College), Ph.D. (Fordham). Assistant Professor of Theology—1965.

Cunningham, Stanley B.; B.A. (Manitoba), M.A. (Toronto), M.S.L. (Pontif. Inst.), Ph.D. (Toronto). Associate Professor of Philosophy—1961.

Czajkowski, M; M.Sc. (Nicholas Copernicus), D.Sc. (Torun, Poland). Associate Professor of Physics—1967.

Daly, Raymond M.; B.S., M.A., Ph.D. (Loyola). Associate Professor of Psychology—1967.

Danish, Ali Asghar; B.Sc. (Southern California), M.Sc. (Cornell), M.Sc. in Ind. Engr. (Georgia Inst. of Tech.). Associate Professor of Industrial Engineering—1967.

Davies, Bernard James; LL.B. (Wales), LL.M., J.D. (Northwestern); of Gray's Inn, Barrister-at-law. Associate Professor of Law—1971.

DeAngelis, Joseph R.; B.F.A. (Rhode Island School of Design), M.F.A. (Syracuse). Assistant Professor of Fine Arts—1969.

Deck, John Norbert; B.A., M.A. (Western Ontario), Ph.D. (Toronto). Professor of Philosophy—1957.

DeLauro, Joseph Nicola; B.F.A. (Yale), M.F.A. (Iowa). Professor and Head, Department of Fine Arts—1960.

Della Valle, Philip A.; B.A. (Windsor), M.A. (Toronto), Ph.D. (State U. of New York). Associate Professor of Economics—1968.

DeMarco, Frank A.; B.A.Sc., M.A.Sc., Ph.D. (Toronto); Vice-President. Professor of Chemistry and Chemical Engineering—1946.

* Devereux, Ralph S.; B.A., M.A. (Western Ontario). Vice-Dean and Professor, Faculty of Education—1951.

deVillers, Jean-Pierre Andreoli; L. es L. (Aix-en-Provence), Ph.D. (Colorado). Associate Professor and Head, Department of French Language and Literature—1968.

Diemer, Ann Henderson (Mrs.); B.A., Ph.D. (Wanyne State). Associate Professor of Sociology—1967.

Dietz, Mary A. (Mrs.); B.A. (Wayne State), M.A. (Michigan State), Ph.D. (Wayne State). Associate Professor of Sociology—1968.

Ditsky, John M.; B.A., M.A. (Detroit), Ph.D. (New York). Associate Professor of English—1967.

Doctor, Antonio P.; B.A.F. (Santo Tomas), M.F.A. (Notre Dame). Assistant Professor of Fine Arts—1967.

Dougherty, Rev. John Roger, C.S.B.; B.A. (Western Ontario), S.T.B. (St. Michael's, Toronto), M.S. (Cornell). Associate Professor of Biology—1951.

Doyle, Robert Joseph; B.A., M.A. (Western Ontario), M.S. (Michigan State), Ph.D. (Wayne State). Professor and Head, Department of Biology—1948.

Drake, John E.; B.Sc., Ph.D. (Southampton). Professor of Chemistry—1969.

Drake, Gordon W. F.; B.Sc. (McGill), M.Sc. (Western Ontario), Ph.D. (York). Associate Professor of Physics—1969.

Drouillard, Clarence Joseph; B.A., M.A. (Toronto), Ph.D. (Laval). Professor of French Language and Literature—1956.

Ducharme, Edward W.; B.A., M.A. (Windsor). Lecturer in English—1969.

Duggal, Krishan; B.A. (Panjab), M.A. (Agra), M.Sc., Ph.D. (Windsor). Associate Professor of Mathematics—1968.

Duthie, James Hunter, M.C.; D.L.C. (Hons.) (Loughborough), Dip. in Psych. (Birmingham), M.S., Ph.D. (Illinois). Professor of Physical and Health Education—1969.

Eaves, Cecil George; B.A. (Denver), M.S. (Oregon), Ph.D. (Ohio). Associate Professor of Physical and Health Education—1968.

Edmunds, Hugh H.; B.A., B.Ed. (Saskatchewan). Associate Professor of Communication Arts—1971.

Egan, Rev. D'Arcy Lawrence, C.Ss.R.; S.T.L. (Catholic U of America). Principal of Holy Redeemer College. Associate Professor of Theology—1957.

Eley, Norman G.; B.A.Sc. (Toronto), M.Auto. Engin. (Chrysler Inst.). Director of Industrial Liaison, Associate Professor of Applied Science—1968.

Engel, Grace; B.A., M.A. (Wayne State). Assistant Professor of Home Economics—1969.

Engelhart, Roland; A.B. (Davidson), Ph.D. (Duke). Associate Professor of Psychology—1968.

England, Gerald; B.A. (Western Ontario), B.Ed., M.Ed. (Toronto). Assistant Professor of Education—1963.

*On leave.

Officers of Instruction

Faber, Seymour; M.A. (Michigan). Lecturer in Sociology—1966.

Fallenbuchl, Zbigniew Marian; B.Sc. (Econ.) (London), M.A. (Montreal), Ph.D. (McGill). Professor and Head, Department of Economics—1957.

Fantazzi, Charles; A.B., M.A. (Catholic U. of America), Ph.D. (Harvard). Associate Professor of Classical Studies and Italian Studies, and Head, Department of Classical Studies—1960.

Farrell, Michael J.; B.A., M.A. (Florida State). Assistant Professor of Fine Arts—1968.

Fathers, Victor R.; B.A. (Western Ontario), B.Ed. (Toronto). Assistant Professor of Education—1965.

Faught, Rev. Donald Thomas, C.S.B.; B.A. (Toronto), M.A. (Michigan). Professor and Head, Department of Mathematics—1954.

Fehr, Robert Charles; B.A. (Toronto), M.A. (Detroit), Ph.D. (Fordham). Professor of Psychology—1951.

Felver, William E.; B.A., M.A. (Cornell). Assistant Professor of Classical Studies—1963.

Ferguson, John D.; B.A., M.A. (Toronto), Ph.D. (Columbia). Associate Professor of Sociology—1968.

Ferraro, Robert C.; B.A. (City College, New York), M.F.A. (Southern Illinois). Assistant Professor of Fine Arts—1968.

Flood, Patrick Francis; B.A., M.A. (Western Ontario), Ph.D. (Ottawa). Professor of Philosophy—1945.

*Fortune, J. Neill; B.Sc.A. (Toronto), M.A. (Western Ontario), Ph.D. (Indiana). Assistant Professor of Economics—1968.

Foster, Georgie Anne (Mrs.); B.A. (Western Ontario)'. Assistant Professor of Education—1962.

Fournier, Guy; Lic. en Droit, D. de l'Un. (Paris). Assistant Professor of French Language and Literature—1967.

Fournier, Yvonne (Mrs.); L.es L., D. de l'Un. (Lille). Assistant Professor of French Language and Literature—1967.

Fracas, Gino; B.A. (Western Ontario), B.Ed. (Alberta), M.A. (Michigan). Professor of Physical and Health Education—1967.

Frisch, Giora Ron; B.A. (City College, N.Y.), Ph.D. (Tennessee). Assistant Professor of Psychology—1969.

Fritz, R. L.; B.A. (McMaster). Associate Professor of Education—1955.

*Galasso, Pasquale J.; B.A., B.P.H.E. (Queen's), M.A., Ph.D. (Michigan). Professor and Dean, Faculty of Physical and Health Education—1965.

Gazetas, Aristides; B.A. (City College of N.Y.), M.F.A. (Boston). Assistant Professor of Dramatic Art—1971.

Gerace, Mary; B.A., M.A. (Windsor). Lecturer in Communication Arts—1967.

Gertz, John Blake; B.S. (Detroit), M.B.A. (Ohio State). Associate Professor of Business Administration—1957.

*On leave.

Gillen, William John; B.A. (Assumption), M.A. (Toronto). Professor of Economics—1959.

*Gnyp, Alex William; B.A.Sc., M.A.Sc., Ph.D. (Toronto). Professor of Chemical Engineering—1958.

Goerzen, Susie Mae (Mrs.); B.S. (Southwestern State College, Okla.), M.S. (Kansas State). Assistant Professor of Home Economics—1969.

Gold, Alan John; B.A. (Windsor), Dip. d'Etudes, Doct. de Spéc. (Clermont). Assistant Professor of Mathematics—1969.

Grandy, Thomas B.; B.A. (Ed.), B.Sc., M.Sc. (Memorial), Ph.D. (Alberta). Assistant Professor of Computer Science—1970.

Gravenor, Conrad P.; B.A. (Toronto), M.S. (Wisconsin), Ph.D. (Indiana). F.R.S.C., Vice-Dean, Division of Mathematics and Science. Professor of Geology—1969.

Gravitz, Herbert L.; B.S. (Maryland), M.A., Ph.D. (Tennessee). Assistant Professor of Psychology—1969.

Green, Reuben; B.A., M.A. (Windsor), Ph.D. (London). Assistant Professor of Economics—1968.

Guccione, Antonio; Laurea (Palermo), Ph.D. (California). Associate Professor of Economics—1967.

Gupta, Anna (Mrs.); B.Sc.N., M.Sc. (Wayne State), Reg. N. Professor and Director, School of Nursing—1968.

Habib, Edwin Emile; B.Sc. (Birmingham), Ph.D. (McMaster). Associate Professor of Physics—1959.

Habowsky, J. E. J.; Diplom-Landwirt (B.S.A.) (Cobourg, Bavaria), M.S.A., Ph.D. (Toronto). Associate Professor of Biology—1964.

Hackett, Joan; B.S.S. (Northwestern), M.A. (Michigan State), Ph.D. (Wayne State). Associate Professor of Dramatic Art—1969.

Hageniers, Omer L.; B.Sc., M.Sc., Ph.D. (Windsor). Lecturer in Mechanical Engineering—1971-72.

Halford, Peter W.; B.A., M.A. (Windsor). Assistant Professor of French Language and Literature—1966.

Hansen, Forrest C.; B.A. (Alberta), B.S.W., M.S.W. (Toronto). Assistant Professor of Social Work—1971.

Hanson, Jens; B.Sc. (M.I.T.), M.A. (Denver), Ph.D. (Yale). Associate Professor of Music—1968.

Haque, Mohd. Razaul; B.Sc., M.Sc. (Aligarh Muslim U.), M.Sc. (Southern Illinois). Assistant Professor of Business Administration—1967.

Harder, Bernhard D.; B.A., M.A. (British Columbia). Assistant Professor of English—1970.

Hartt, James Paul; B.A.Sc. (Toronto), O.L.S., M.S.C.E. (Wayne State). Associate Professor of Civil Engineering—1958.

*Hedgecock, Nigel Edward; B.A., M.A. (British Columbia), Ph.D. (McMaster). Associate Professor of Physics—1961.

*On leave.

Helbing, Reinhard K. B.; B.Sc., M.Sc., Ph.D. (Rhein. Friedr. Wilhelms U., Bonn). Professor of Physics—1972.

Helling, Rudolph A.; B.A. (Wayne State), Dipl. Disc. Pol. (Wilhelmshaven-Goettingen), Ph.D. (Wayne State). Professor of Sociology—1956.

Hencher, John L.; B.A., Ph.D. (McMaster). Assistant Professor of Chemistry—1967.

*Hermiston, Ray Talbot; B.A., B.P.H.E. (Queen's), M.S., Ph.D. (Michigan). Associate Professor of Physical and Health Education—1966.

Hewitt, Irene M. (Mrs.); B.A. (Western Ontario), A.M.L.S. (Michigan). Assistant Professor and Librarian, Faculty of Education—1962.

*Hill, Rev. Henry Gordon; B.A. (Queen's), B.A., M.A. (Cambridge), L.Th. (Trinity). Associate Professor of History—1964.

Hirota, Theodore T.; B.A. (British Columbia), M.A., Ph.D. (Toronto). Assistant Professor of Psychology—1968.

Hoffman, The Rev. John Charles; B.A. (Toronto), B.D., Ph.D., S.T.M. (McGill), Th.D. (Union Theol. Sem.), Principal of Iona College. Associate Professor of Theology—1964.

Holland, Cornelius J.; B.S. (St. Joseph's, Philadelphia), M.A. (Detroit), Ph.D. (Catholic U. of America). Associate Professor of Psychology—1967.

Holland, William John; B.Sc. (Queen's), M.S., Ph.D. (Wayne State). Professor of Chemistry—1960.

Holman, Margery Jean; B.A., B.P.H.E. (Windsor). Lecturer in Physical and Health Education—1970.

Holmes, David M.; B.A. (Western Ontario), M.A. (Windsor), D.Phil. (Oxford). Associate Professor of English—1964.

Holuj, Frank; B.Sc. (London, England), M.Sc., Ph.D. (McMaster). Professor of Physics—1961.

Horn, Dieter; Dr. phil. (Marburg). Associate Professor of German Language and Literature—1966.

Horne, Gilbert Richard, C.D.; B.A. (Western Ontario), M.A., Ph.D. (Michigan). Professor and Dean, Faculty of Business Administration—1931.

Hornsey, Richard F.; B.A., M.A. (Windsor). Lecturer in English—1969.

Horvath, Theodore; B.A. (Waterloo Lutheran), M.A., Ph.D. (Windsor). Assistant Professor of Psychology—1968.

Hoskins, Ronald G.; B.A., M.A. (Windsor). Assistant Professor of History—1966.

Howell, Rev. Arthur Robert, C.S.B.; B.Sc. (Saskatchewan), S.T.B. (St. Michael's, Toronto), M.A.Sc. (Toronto). Associate Professor of Mechanical Engineering—1958.

Hrycay, Rudolph; B.A., M.A. (Saskatchewan) Ph.D. (Alberta). Assistant Professor of Mathematics—1969.

Huang, Roderick; B.A. (Fukien Christian, China), M.A. (Wesleyan), Ph.D. (Northwestern). Professor of English—1965.

*On leave.

Hudec, Peter P.; B.Sc. (Western Ontario), M.S., Ph.D. (Rensselaer Polytech. Inst.). Associate Professor of Geology—1970.

*Hughes, Margaret E.; B.A., LL.B. (Saskatchewan), LL.M., M.S.W. (Michigan); of Osgoode Hall, Barrister-at-Law. Associate Professor of Law—1968.

Huschilt, John; B.A., M.A. (Toronto), Ph.D. (Wayne State). Associate Professor of Physics—1953.

Ianni, Ronald W.; B.A., B.Comm. (Windsor), LL.B. (Osgoode Hall), C.U.E.C.E. (Dip.), I.H.E.I. (Dip.) (Paris), Ph.D. (London); of Osgoode Hall, Barrister-at-law. Associate Professor of Law—1971.

Jacobs, Roger F.; A.B., J.D. (Detroit), A.M.L.S. (Michigan); Member of the Michigan Bar. Law Librarian and Professor of Law—1967.

Jairazbhoy, N. A.; B.A. (Washington), Ph. D. (London). Associate Professor of Asian Studies—1969.

Janzen, Henry David; B.A. (Assumption), M.A. (Windsor), Ph.D. (Wayne State), Assistant Professor of English—1970.

Johnson, Ralph Henry; B.A. (Xavier), M.A. (Notre Dame). Assistant Professor of Philosophy—1966.

Johnston, D. Ross; B.Comm. (Alberta), M.B.A. (McMaster), C.A. Associate Professor of Business Administration—1968.

Jones, Joyce A.; B.S.N. (Saskatchewan). Reg. N. Lecturer in Nursing—1970.

Jull, Robert Kinsley; B.Sc., M.Sc. (Alberta), Ph.D. (Queensland). Associate Professor of Geology—1968.

Jullien, Graham A.; B.Tech. (Loughborough), M.Sc. (Birmingham), Ph.D. (Aston). Assistant Professor of Electrical Engineering—1969.

Kaloni, Purna N.; M.Sc. (Allahabad), M.Tech., Ph.D. (Indian Inst. of Tech.) Professor of Mathematics—1970.

Kaplan, Marvin L.; B.A. (Rochester), Ph.D. (Buffalo). Professor of Psychology—1969.

Keenleyside, Terence A.; B.A. (Toronto), Ph.D. (London). Assistant Professor of Political Science—1971.

Keller, Gerald; B.Sc. (Sir George Williams), M.A. (Wayne State). Assistant Professor of Business Administration—1971.

Kelly, Daniel Patrick; B.A., M.A. (Toronto). Professor and Director, School of Dramatic Art—1958.

Kelly, Thomas I.; S.T.L. (Catholic U. of America). Assistant Professor of Theology—1967.

*Kennedy John B.; B.Sc. (Hons.) (Cardiff), Ph.D. (Toronto). Professor and Head, Department of Civil Engineering—1963.

Kennedy, Rev. Leonard Anthony, C.S.B.; B.A., M.A., Ph.D. (Toronto). Professor of Philosophy—1963.

Kimmerle, Marliese; B.A., B.P.H.E. (Queen's). Assistant Professor of Physical and Health Education—1969.

*On leave.

King, Bruce A.; B.A. (Columbia), Ph.D. (Leeds). Professor of English—1970.

King, Joseph Norman; B.A., M.A. (Toronto), S.T.B. (Laval), Ph.D. (U. of St. Michael's College). Assistant Professor of Theology—1964.

Kingston, Rev. Frederick Temple; B.A., M.A. (Toronto), L.Th., B.D. (Trinity), D.Phil. (Christ Church, Oxford), Principal, Canterburry College. Professor of Philosophy—1959.

Kingstone, Basil D.; B.A., M.A., Ph.D. (Oxford). Associate Professor of French Language and Literature—1963.

Kinnin, Edward; B.A. (Western Ontario), M.Ed. (Wayne State). Assistant Professor of Education—1962.

Kliever, Lonnie D.; B.A. (Hardin-Simmons U.) B.D. (Union Theol. Sem.), Ph.D. (Duke). Professor of Theology—1969.

Klinck, David M.; B.A., M.A. (Western Ontario). Lecturer in History—1968.

Kobasigawa, Akira; B.A., M.A. (George Peabody College), Ph.D. (Iowa). Associate Professor of Psychology—1969.

Kolinski, Ralph; B.S. (Marquette), M.A., Ph.D. (Wayne State). Associate Professor of Economics—1966.

Koloseike, Alan D.; B.A. (Cornell), M.A. (U.C.L.A.). Assistant Professor of Anthropology—1970.

Kovacs, Aranka Eve; B.A. (McMaster), M.A. (Toronto), Ph.D. (Bryn Mawr). Professor of Economics—1961.

Kovarik, Edward; B.M., B.M.E., M.M. (Northwestern), M.A. (Harvard). Assistant Professor of Music—1967.

Krause, Lucjan; B.Sc. (London, England), M.A., Ph.D. (Toronto), D.Sc. (London), F.Inst.P. Professor and Head, Department of Physics—1958.

Krause, Robert G.; B.A., M.A. (Windsor). Assistant Professor of Political Science—1970.

Kroeker, Bernard J.; B.Ed. (Alberta). B.S.W., M.S. W. (Toronto). Associate Professor of Social Work—1969.

Kubota, Akira; B.A. (Tokyo), M.A., Ph.D. (U. of Michigan). Associate Professor of Political Science—1970.

Kuffel, Edmund; B.Sc., M.Sc., Ph.D. (Dublin), D.Sc. (Manchester). Professor and Head, Department of Electrical Engineering—1970.

Kulisek, Larry Lee; B.S. (Northwest Missouri State), M.A. (Omaha). Lecturer in History—1968.

Laba, Jan Tadeusz; Dip. Ing. (London), M.A.Sc., Ph.D. (Windsor). Associate Professor of Civil Engineering—1961.

LaFave, Lawrence Edward; B.A. (Minnesota), M.A. (North Dakota), Ph.D. (Oklahoma). Professor of Psychology—1968.

LaGaipa, John; B.A. (Hobart College), M.A. (U. of Michigan), Ph.D. (American U.). Professor of Psychology—1968.

Lall, Amrit; B.A., M.A. (Panjab), Ph.D. (Indiana). Associate Professor of Geography—1967.

Lanz, Barbara Ann; B.Sc., M.S. (Stout State). Lecturer in Home Economics—1971.

Lasker, George E.; M.S. (Inst. of Tech., Prague), Ph.D. (Charles U., Prague). Professor of Computer Science—1968.

LaValle, Placido D.; B.A. (Columbia), M.A. (Southern Illinois), Ph.D. (State U. of Iowa). Associate Professor of Geography—1969.

Law, William C.; B.F.A. (Atlanta School of Art), M.F.A. (Tulane). Lecturer in Fine Arts—1970.

Layne, Neville W.; B.A. (West Indies), M.A., Ph.D. (California). Assistant Professor of Sociology—1968.

Leavitt, Jack L.; B.Ed. (Alberta), M.S. (Oregon), Ed.D. (California). Associate Professor of Physical and Health Education—1967.

Leddy, John Francis; M.A. (Sask.), B.Litt. D. Phil. (Oxon.), D.Litt. (St. Francis Xavier), D. es L. (Laval), D.Lit. (Ottawa), LL.D. (Assumption, Hanyang [Korea], Notre Dame [Nelson], Sask., Toronto), D.C.L. (St. Mary's). President and Vice-Chancellor—1964. Professor of Classical Studies—1970.

LeDuc, Lawrence W. Jr.; B.A. (Windsor), M.A. (Wayne State), Ph.D. (Michigan). Associate Professor of Political Science—1967.

Leiter, Darryl; B.S., M.S. (Georgia Tech), Ph.D. (Brandeis). Associate Professor of Physics—1970.

Lemieux, Gerard A.; B.A. (Laurentian), M.A. (Laval). Assistant Professor of French Language and Literature—1967.

Lemire, Francis William, B.Sc. (Windsor), M.Sc., Ph.D. (Queen's). Associate Professor of Mathematics—1970.

Lennon, James H.; B.A. (Toronto). Assistant Professor of Education—1956.

Lewis, John Underwood; A.B. (North Texas State). Ph.D. (Marquette). Associate Professor of Philosophy—1964.

Libby William L.; A.B. (Harvard). M.B.A., Ph.D. (Chicago). Associate Professor of Psychology—1970.

Lin, Che-shung; B.Sc., M.Sc. (National Taiwan), Ph.D. (Saskatchewan). Associate Professor of Chemistry—1967.

McAnsh, Jennie E.; B.Sc., M.Ed. (Wayne State). Assistant Professor of Education—1966.

McAuliffe, John W.; B.S. (Fordham), M.B.A. (Michigan), J.D. (Detroit). Member of the Michigan Bar; Certified Public Accountant, New York and Michigan. Assistant Dean and Professor, Faculty of Law—1968.

McCarthy, Lillian Margaret; B.A., M.A., Ph.D. (Toronto). Professor of French Language and Literature—1958.

McCaskill, David G.; B.Sc., M.A. (Manitoba). Assistant Professor of Philosophy—1969.

M'Closkey, Robert T.; B.A. (U.C.L.A.), M.A. (California State), Ph.D. (U. of California). Assistant Professor of Biology —1970.

McConkey, John William; B.Sc., Ph.D. (Queen's University of Belfast). F. Inst. P. Professor of Physics—1970.

McCorquodale, John Alexander; B.E.Sc. (Western Ontario), M.Sc. (Glasgow), Ph.D. (Windsor). Associate Professor of Civil Engineering—1966.

McCrone, Kathleen E.; B.A. (Saskatchewan), M.A., Ph.D. (New York). Assistant Professor of History—1968.

McCurdy, Howard Douglas; B.A. (Western Ontario), B.Sc. (Assumption), M.Sc., Ph.D. (Michigan State). Professor of Biology—1959.

McDermott, Phyllis; B.Sc. (Nazareth College), M.S. (Michigan State). Associate Professor and Head, Department of Home Economics—1959.

McDonald, James F.; B.S., Ph.D. (Wayne State). Associate Professor of Mathematics—1967.

McDonald, Thomas William; B.Sc., M.Sc. (Queen's), Ph.D. (Purdue). Professor of Mechanical Engineering—1968.

McFarlane, Sheila (Mrs.); B.Sc.N. (Western Ontario). Reg. N. Lecturer in Nursing—1970.

*MacGuigan, Mark R., M.P.; B.A. (St. Dunstan's); M.A., Ph.D. (Toronto); LL.M., S.J.D. (Columbia); of Osgoode Hall, Barrister-at-Law. Professor of Law—1967.

McGuigan, William Gerard; L.G.S.M. (Guildhall School of Music and Drama). Assistant Professor of Voice and Speech—1968.

MacInnis, Cameron; B.Sc. (Dalhousie), B.E. (Hons.) (Nova Scotia Technical College), Ph.D. (Dunelm). Professor of Civil Engineering—1963.

McIntosh, John McLennan; B.Sc. (Queen's), Ph.D. (M.I.T.). Assistant Professor of Chemistry—1968.

McIntyre, Paul P.; Mus.Bac., Mus.Doc. (Toronto). Professor and Head, Department of Music—1970.

McIsaac, James Albert; B.A., B.S.W., M.S.W. (Toronto). Associate Professor of Social Work—1969.

McKay, Linda (Mrs.); B.A. (North Carolina), M.S. (Maryland). Assistant Professor of Home Economics—1968.

MacKendrick, Louis King; B.A., M.A. (Western), Phil.M., Ph.D. (Toronto). Assistant Professor of English—1971.

McKenney, Donald J.; B.Sc., M.Sc. (Western Ontario), Ph.D. (Ottawa). Associate Professor of Chemistry—1964.

McLaren, John Peter S.; LL.B. (St. Andrews), LL.M. (U. College, London), (Michigan). Associate Professor of Law—1971.

MacLeod, Alistair; B.A., B.Ed. (St. Francis Xavier), M.A. (New Brunswick), Ph.D. (Notre Dame). Assistant Professor of English—1969.

McNamara, Eugene Joseph; B.A., M.A. (DePaul), Ph.D. (Northwestern). Professor of English—1959.

McPhail, Gerard; B.Sc., M.Sc. (Queen's). Assistant Professor of Mathematics—1969.

Mady, Diane Marie; B.A. (Assumption). Assistant Professor of Dramatic Art—1970.

Majhanovich, Ljubo D.; B.A., M.A. (Toronto). Lecturer in Russian—1970.

*On leave.

Malley, Rev. Eugene R., C.S.B.; B.A., M.A. (Toronto), S.T.L., S.T.D. (Angelicum). President of Assumption University. Vice-Dean, Division of Humanities and Languages; Professor of Theology—1964.

Malmsten, Albert C.; B.S., M.S. (Michigan); J.D. (Detroit); Member of the Michigan Bar. Professor of Law—1969.

Malone, John Alphonse; B.A. (Western Ontario), M.A. (Toronto), Ph.D (Fordham). Professor of Psychology—1959.

Manley, Paul L.; B.Sc., M.Sc. (Alberta). Assistant Professor of Mathematics—1967.

Manzig, John G. W.; LL.B., LL.M. (Dalhousie), Lic. iur, Dr. iur. (Cologne). Member of the Bar of Nova Scotia. Associate Professor of Law—1970.

Marasinghe, M. Lakshman; LL.B., LL.M. (University College, London), of the Inner Temple, Barrister-at-Law. Associate Professor of Law—1970.

Martin, Sue G.; B.A., M.A., Ph.D. (Wayne State). Assistant Professor of Dramatic Art—1971-72.

Mathur, Gurucharan Prasad; B.S. (Bombay), M.S., Ph.D. (Northwestern). Associate Professor of Chemical Engineering—1964.

Mauch, Robert K.; B.M. (Michigan), M.M. (New York U.). Assistant Professor of Music—1969.

Meadley, Cyril Keith; B.Sc. (Western Ontario), M.Sc. (Laval), Ph.D. (Manchester). Associate Professor of Mathematics—1968.

Mehmet, Ozay; B.Sc. (L.S.E.), M.A., Ph.D. (Toronto). Associate Professor of Economics—1969.

Mehta, Mahesh; B.A., M.A., LL.B., Ph.D. (Bombay). Assistant Professor of Asian Studies—1969.

*Mendels, Roger P.; B.Comm., M.A. (McGill), M.Sc., Ph.D. (Wisconsin). Associate Professor of Economics—1969.

Metcalfe, Alan; D.L.C. (Loughborough), B.P.E. British Columbia), M.S., M.A., Ph.D. (Wisconsin). Associate Professor of Physical and Health Education—1969.

Meyer, Benjamin S.; B.A. (City College of N.Y.), M.A. (Buffalo). Assistant Professor of Economics—1970.

Miller, William C.; B.S.E. (Michigan), M.A.Sc., Ph.D. (Waterloo). Associate Professor of Electrical Engineering—1968.

Milton, Helen I.; B.A. (Queen's), S.T.B., M.Th., D.Th. (Trinity College, Toronto). Associate Professor of Theology—1967.

Milton, Mavis T.; B.Sc., B.Ed., M.Sc. (Manitoba). Assistant Professor of Home Economics—1971.

Miner, Brother Bonaventure; B.A. (Toronto, London), M.A. (Toronto), Ph.D. (London). Associate Professor of History—1967.

Minton, Henry L.; B.A. (New York), M.A. (Southern Illinois), Ph.D. (Pennsylvania State). Associate Professor of Psychology—1970.

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Mitra, Juliana Carmen T. (Mrs.); B.Sc.N. (Philippine Women's U.), M.Sc.N (Western Ontario). Reg. N. Assistant Professor of Nursing—1969.

Molloy, Mary Elizabeth; B.A., M.Sc.(N) (Western Ontario), Dip. P.H.N. (Toronto). Reg.N. Associate Professor of Nursing—1963.

Monforton, Gerard R.; B.A.Sc. (Assumption), M.A.Sc. (Windsor), Ph.D. (Case). Associate Professor of Civil Engineering—1962.

Moore, Stewart; B.A., M.A., M.S.W. (Wayne State). Associate Professor of Social Work—1968.

Morf, Martin E.; B.A. (Acadia), M.A. (Dalhousie), Ph.D. (Western Ontario). Assistant Professor of Psychology—1969.

Moriarty, Richard James; B.A., M.A. (Assumption), M.Ed. (Wayne State), Ph.D. (Ohio State). Professor of Physical and Health Education—1956.

Morrow, Harry M.; B.A., B.S.W., M.S.W. (British Columbia). Professor and Director, School of Social Work—1966.

Mouratides, Anastasio Isaac; B.Comm., M.A., Ph.D. (McGill). Associate Professor, Department of History—1964.

Mukkur, T.K.S.; B.V.Sc. (Punjab), M.V.Sc. (Indian Vet. Inst.), Ph.D. (Florida). Assistant Professor of Biology—1971.

Mulvihill, Rev. Daniel Joseph, C.S.B.; B.A. (Western Ontario), M.A., Ph.D. (Michigan). Professor of History—1942.

Murrah, Charles Clay; B.A. (Chicago), M.A., Ph.D. (Harvard). Associate Professor of English—1970.

Murray, J. Alex; B.Comm. (Assumption), M.B.A. (McMaster), Ph.D. (Illinois). Professor of Business Administration—1966.

Musson, Harold Douglas; B.Comm. (Windsor), M.B.A. (Michigan State). Assistant Professor of Business Administration—1968.

Namikas, Gediminas A.; B.A. (Northwestern), M.Sc., Ph.D. (Wisconsin). Associate Professor of Psychology—1968.

Neal, George H.; B.S., M.A. (Memphis State), D.B.A. (Michigan State). Associate Professor of Business Administration—1970.

Nease, A. Stuart; B.A., M.A. (Toronto). Dean and Professor, Faculty of Education—1972.

Neilson, George L.; Dip. in Drama and Speech (Glasgow), M.F.A. (Georgia). Associate Professor of Drama and Speech—1967.

Nelson, David L.; B.A. (Augustana College), Ph.D. (Waterloo). Assistant Professor of Chemistry—1971-72.

Nelson, Ralph Carl; B.A., M.A. (DePaul), Ph.D. (Notre Dame). Professor of Political Science—1961.

Nephew, J. Harold; B.A. (Laurentian), B.Ed., M.Ed. (Toronto). Assistant Professor of Education—1963.

Nicholas, Cyrus B.; B.A., M.A. (Ohio State). Lecturer in Fine Arts—1970.

Nielsen, Harry A.; A.B. (Rutgers), M.A. (Connecticut), Ph.D. (Nebraska). Professor of Philosophy—1968.

Nolan, Brian P.; B.A., M.A. (Windsor). Lecturer in History—1969.

North, Walter P. T.; B.Sc. (Queen's), M.Sc. (Saskatchewan), Ph.D. (Illinois). Professor of Mechanical Engineering—1965.

O'Donoghue, Rev. John Michael Curtis, C.S.B.; B.A., M.A. (Toronto), A.M. (Harvard). Associate Professor of Hispanic and Italian Studies—1959.

O'Farrell, John Kevin Anthony; B.A., M.A. (Western Ontario), Ph.D. (Ottawa), F.R.S.A. Associate Professor of History—1962.

Ogata, Hisashi; B.S. (Tokyo College of Science). M.S. (Tokyo U. of Education), Ph.D. (Western Reserve). Associate Professor of Physics—1965.

Oguchi, Noriyoshi; B.A., M.A. (International Christian U., Tokyo). Assistant Professor of Economics—1971.

Okey, Allan B.; B.Sc. (Wisconsin), M.S., Ph.D. (Southern Illinois). Associate Professor of Biology—1967.

Olafson, Gordon Albert Alexander; B.P.E., M.P.E. (British Columbia). Ph.D. (Illinois). Assistant Professor of Physical and Health Education—1969.

O'Meara, Rev. John Patrick, C.S.B.; B.A. (Toronto), M.A. (Wayne State), Ph.D. (Ottawa). Professor of History—1959.

Oosterhoff, Albert H.; B.A., LL.B. (Western Ontario); LL.M. (Toronto); of Osgoode Hall, Barrister-at-law. Associate Professor of Law—1969.

Orona, Angelo R.; B.A., M.A., Ph.D. (California at Los Angeles). Assistant Professor of Anthropology—1969.

Orr, Robert R.; B.A. (Valparaiso), M.A., Ph.D. (Iowa). Assistant Professor of Psychology—1969.

Palmer, David John; B.Mus., M.Mus. (Michigan). Assistant Professor of Music—1970.

Pappert, Edward Cecil, C.S.B.; B.A. (Toronto), M.A. (Detroit), Ph.D. (Ottawa). Dean of Extension and Continuing Education. Assistant Professor of English—1950.

Parr, James Gordon; B.Sc. (Leeds), Ph.D. (Liverpool), F.R.S.C. Dean of Applied Science and Professor of Engineering Materials—1964.

Paterson, J. Craig; LL.B. (Western Ontario), LL.M. Harvard). Assistant Professor of Law—1971.

Paul, Roy Vance; B.A. (Northern Michigan), M.A. (Michigan State). Assistant Professor of Drama and Speech—1967.

Pazik, Rev. Ronold Stanly, C.S.B.; B.A. (Western Ontario), M.A. (Toronto), Cert. Est. del Doct. (Madrid). Associate Professor and Head, Department of Hispanic and Italian Studies—1955.

Peebles, Christopher S.; A.B. (Chicago), M.A., Ph.C. (California at Santa Barbara). Assistant Professor of Anthropology—1970.

Pemberton, Ian Cleghorn; B.A. (Bishop's), M.A. (Toronto). Lecturer in History—1968.

Perez-Soler, Vincente; Dr. en F. y L. (Valencia). Associate Professor of Hispanic and Italian Studies—1966.

Perz, Matthias Casimir; M.Sc. (Poznan), Dipl. Eng. (Ecole Sup. d'Elect., Paris). Professor of Electrical Engineering—1968.

Petras, Michael Luke; B.Sc. (Assumption), M.Sc. (Notre Dame), Ph.D. (Michigan). Professor of Biology—1956.

Philip, Brother Roger, F.S.C. (William James Overend); B.A., M.A. (Toronto), Ph.D. (Catholic U. of America). Professor Emeritus, Department of Psychology—1956.

Phillips, Timothy; B.Sc., M.Sc. (Windsor). Assistant Professor of Chemistry—1971-72.

Phillips, William Gregory; B.A., M.A., Ph.D. (Toronto). Dean of Arts and Science; Professor of Economics—1950.

Pillay, Dathathry T. N.; B.Sc. Ag. (Osmania, India), M.S., Ph.D. (Cornell). Professor of Biology—1963.

Pinto, Robert Charles; B.A., M.A. (Toronto). Assistant Professor of Philosophy—1963.

Plante, Homer Frederick; B.A. (Western Ontario), M.A. (Toronto). Associate Professor of English—1956.

Powley, Maurice Bruce; B.A.Sc., M.A.Sc. (British Columbia). Associate Professor of Chemical Engineering—1968.

Pradhan, Mahesh Chandra; B.A. (Agra), M.A., LL.B. (Lucknow), Ph.D. (London). Professor of Anthropology—1970.

Price, Richard G.; B.A. (Florida State), M.A. (Wayne State). Assistant Professor of Political Science—1969.

Price, Stanley James Whitworth; B.A., M.Sc. (British Columbia), Ph.D. (Edinburgh). Professor of Chemistry—1959.

Price, Trevor; B.Sc. (London School of Economics), M.A. (Windsor). Assistant Professor of Political Science—1968.

Primorac, Berislav; B.A. (Assumption), M.A. (Middlebury). Assistant Professor of Hispanic and Italian Studies—1968.

Pryke, Kenneth G.; B.A. (Carleton), M.A., Ph.D. (Duke). Associate Professor of History—1963.

Pufahl, John K. Jr.; B.F.A. (Illinois Wesleyan), M.A., M.F.A. (Northern Illinois). Assistant Professor of Fine Arts—1967.

Querbach, Carl W.; B.A., B.D., S.T.M. (Concordia), M.A., Ph.D. (Michigan). Assistant Professor of Classical Studies—1966.

Querbach, Mrs. Carlyn A.; A.B. (Mount Holyoke), M.A. (Michigan). Assistant Professor of Classical Studies—1966.

Quinn, Rev. Joseph A., C.S.B.; B.A., M.A. (Boston College), S.T.B. (St. Basil's) Ph.D. (Purdue). Assistant Professor of English—1965.

*Qureshi, Abdul H.; M.E. (Peshawar), Ph.D. (Tech. U., Aachen). Professor of Electrical Engineering—1966.

Raby, Stewart; B.A. (Oxford), M.Sc. (Alberta), Ph.D. (Wales). Associate Professor of Geography—1970.

Ragab, Abd-Elmegid Ali; B.Comm. (Cairo), M.B.A. (Boston), Ph.D. (American U.) Associate Professor of Business Administration—1969.

Ramcharan, Subhas; B.A., M.Sc. (U. of the West Indies). Lecturer in Sociology—1971.

*On leave.

*Ransome, Jack C.; A.B., M.A. (Toledo); M.A., Ph.D. (Harvard). Professor of Geography—1966.

Raouf, Abdul; M.S.I.E. (Toledo), Ph.D. (Windsor). Associate Professor of Industrial Engineering—1966.

Ratushny, Edward Joseph; B.A., LL.B. (Saskatchewan), LL.M. (London). Member of the Bar of Saskatchewan. Associate Professor of Law—1970.

Record, Rev. Maurice Adrian, C.S.B.; B.A. (Western Ontario), M.A. (Toronto). Associate Professor of Psychology—1952.

Reif, Zygmunt Francis; B.Sc. (Battersea), Ph.D. (London). Associate Professor of Mechanical Engineering—1969.

Reynolds, David V.; A.B. (Massachusetts), Ph.D. (Stanford). Associate Professor of Psychology—1969.

Rezek, Joseph; B.A.Sc., M.A.Sc., Ph.D. (Toronto). Associate Professor of Engineering Materials—1967.

Romanow, Walter I.; B.A., M.A. (Windsor), Associate Professor of Communication Arts—1965.

Romsa, Gerald H.; B.Sc. (Manitoba), M.A. (Waterloo), Ph.D. (Florida), Assistant Professor of Geography—1970.

Rosenbaum, Edward; B.A. (Wayne State), M.S., Ph.D. (Wisconsin) C.F.A. Professor of Business Administration—1969.

*Ross, David P.; B.A., M.A. (Alberta), Ph.D. (Duke). Associate Professor of Economics—1968.

*Rourke, Byron Patrick; B.A. (Windsor), M.A., Ph.D. (Fordham). Associate Professor of Psychology—1965.

Rozsnyai, Imre; M.M., M.M.A. (Yale). Assistant Professor of Music—1970.

Rubin, Kenneth Howard; B.A., (McGill); M.A., Ph.D. (Pennsylvania State). Assistant Professor of Psychology—1971.

Rumfeldt, Robert Clark; B.Sc. (Loyola, Montreal), Ph.D. (Alberta). Associate Professor of Chemistry—1965.

Rumscheidt, H. Martin; B.A., B.D., S.T.M., Ph.D. (McGill). Assistant Professor of Theology—1970.

Ruth, Rev. Norbert Joseph, C.S.B.; B.A., M.A. (Toronto). Professor of Physics and Special Lecturer in Philosophy of Science—1951.

Rutherford, Kenneth Gerald; B.A. (Western Ontario), Ph.D. (Wayne State). Professor of Chemistry—1958.

St. Pierre, Carl Clifford; B.A.Sc. (Assumption), M.A.Sc., Ph.D. (Northwestern). Associate Professor of Chemical Engineering—1964.

Sabina, Leslie Robert; A.B. (Cornell), M.S., Ph.D. (Nebraska). Professor of Biology—1965.

*Sanders, Douglas Esmond; B.A., LL.B. (Alberta), LL.M. (California at Berkeley); Member of the Bars of Alberta and British Columbia. Associate Professor of Law—1969.

*On leave.

Sanders, Leta Grace, Reg. N.; Cert. in Teaching and Supervision (Western Ontario), B.S., M.A., M.Ed. (Columbia). Associate Professor of Nursing—1960.

*Sanderson, Marie Elizabeth (Mrs. R. M.); B.A. (Toronto), M.A. (Maryland). Ph.D. (Michigan). Associate Professor and Acting Head, Department of Geography (1971-72)—1965.

Sarkar, Kalyan Kumar; B.A., M.A. (Calcutta), Doctorat (Paris). Associate Professor of Asian Studies—1970.

Sautter, Udo; B.Phil., St.E. 1st and 2nd, Ph.D. (U. of Tuebingen). Associate Professor of History—1969.

Schlesinger, Mordechay; M.Sc., Ph.D. (Jerusalem). Professor of Physics—1968.

Schmidt, Donald E.; B.Sc. (Iowa State), Ph.D. (Cal. Inst. of Tech.). Assistant Professor of Chemistry—1969.

Schneider, Frank W.; B.A. (Wesleyan), M.S. (Ohio), Ph.D. (Florida). Associate Professor of Psychology—1968.

Seale, Ronald G.; B.A., M.A. (Alberta). Lecturer in Geography—1969.

Selby, Michael Allen; B.Sc. (Manitoba), M.A., Ph.D. (Cornell). Assistant Professor of Mathematics—1970.

Selby, Stuart; B.A. (Hamilton College, N.Y.), M.A., Ed.D. (Columbia). Associate Professor and Head, Department of Communication Arts—1970.

Sharma, Deoki Nandan; B.A., M.A. (Agra). Assistant Professor of Asian Studies—1969.

Sharratt, Michael T.; B.A., M.A. (Western Ontario). Assistant Professor of Physical and Health Education—1967.

Shklov, Norman; B.A. (Manitoba), M.A. (Toronto). Professor of Mathematics—1967.

Shridhar, Malayappan; B.Sc. (Bombay), M.S. (Brooklyn), Ph.D. (Aston). Assistant Professor of Electrical Engineering—1969.

Signorile, Vito; B.A., M.A. (Catholic U.), Ph.D. (Maryland). Associate Professor and Head, Department of Sociology and Anthropology—1969.

Silverman, Hugh W., Q.C.; B.A., M.A. (Toronto); of Osgoode Hall, Barrister-at-law. Professor of Law—1969.

Singh, Ripu Daman; B.A., M.A. (Lucknow), M.A., Ph.D. (Oregon). Associate Professor of Anthropology—1970.

Skakoon, Walter Sylvester; B.A. (Western Ontario), M.A. (Toronto). Associate Professor of French Language and Literature—1962.

Smedick, Lois Katherine; B.A. (Wilson), M.S.L. (Pontif. Inst.), Ph.D. (Bryn Mawr). Associate Professor of English—1963.

Smith, Alexander Cormac; B.Sc., M.Sc., Ph.D. (Dublin). Professor of Mathematics—1963.

Smith, Alfred Arthur; B.A., M.A. (Queen's), Ph.D. (McGill). Professor of Psychology—1959.

Smith, Joyce C. (Mrs.); B.A. (Syracuse), M.A. (Wisconsin). Associate Professor of English—1967.

*On leave.

Smith, Raymond J.; B.A., M.A., Ph.D. (Wisconsin). Professor of English—1964.

Smith, Terence E.; B.Sc., Ph.D. (Wales). Associate Professor of Geology—1969.

Smith, Vernon A.; B.A. (Alberta), M.A., Ph.D. (Florida). Assistant Professor of Geography—1969.

Snyder, Sally; B.A., Ph.D. (Washington). Associate Professor of Anthropology—1971.

Soderlund, Walter C.; B.A. (Connecticut), M.A., Ph.D. (Michigan). Associate Professor of Political Science—1968.

Solomon, Hassim M.; B.A. (U. of South Africa), M.A., Ph.D. (Southern Illinois). Assistant Professor of Sociology—1969.

*Sonnenfeld, Peter; Matura (Berlin), Absolut. Rer. Nat. (Bratislava), Dr. Rer. Nat. (Prague). Professor and Head, Department of Geology—1966.

Spellman, John W.; B.A. (Northeastern), Ph.D. (London). Professor and Head, Department of Asian Studies—1967.

Sridhar, Krishnaswamy; B.Sc. (Madras U.), D.M.I.T. (Madras Inst. of Technology), M.A.Sc., Ph.D. (Toronto). Professor of Mechanical Engineering—1963.

Stadder, W. Earl; B.A. (McMaster), M.Ed. (Toronto). Assistant Professor of Education—1962.

Stager, Robert A.; B.Sc., M.Sc. (Toronto), Ph.D. (Illinois). Professor of Chemical Engineering—1963.

Starkman, Bernard; B.A., LL.B. (Toronto), Dipl. de Dr. Comp. (Strasbourg), LL.M (McGill). Member of the Bar of Manitoba and of Osgoode Hall. Associate Professor of Law—1971.

Starr, Meyer W.; B.A., (Toronto), M.A. (Princeton). Associate Professor of Psychology—1961.

Stebelsky, Ihor; B.A., M.A. (Toronto), Ph.D. (Washington). Associate Professor of Geography—1968.

Steeves, Ross T.; B.A. (Queen's), B.Ed., M.Ed., (Toronto). Assistant Professor of Education—1962.

Stephenson, Marylee; B.A. (California), M.A. (Essex). Lecturer in Sociology—1971.

Stevens, Peter; B.A. (Nottingham), M.A. (McMaster), Ph.D. (Saskatchewan). Associate Professor of English—1969.

Stewart, Donald R.; B.A., M.A. (Wayne State). Assistant Professor of Sociology—1966.

Stewart, George Radmore; B.A. (Carleton), LL.B. (Ottawa), LL.M. (London); of Osgoode Hall, Barrister-at-Law. Associate Professor of Law—1970.

*Stokes, Rev. Thomas J., C.S.B.; B.A., M.A., Ph.D. (Toronto). Assistant Professor of Philosophy—1966.

Stolar, Robert W.; B.Comm. (Toronto), M.B.A. (McMaster), R.I.A., C.A. Associate Professor of Business Administration—1966.

Stollman, Samuel S.; Rabbi (Yeshiva U.), B.Sc. (Columbia), M.A., Ph.D. (Wayne State). Associate Professor of English—1966.

*On leave.

Strick, John Charles; B.A. (Manitoba), M.A. (Assumption), Ph.D. (Alberta). Associate Professor of Economics—1965.

Subudhi, Purna; B.A. (Utkal), M.S.W. (Lucknow), Ph.D. (Wayne State), M.P.H. (Michigan). Associate Professor of Social Work—1968.

Sullivan, John Francis; B.S., M.A. (Detroit), Ph.D. (Michigan). Professor and Head, Department of English—1958.

Suttor, Timothy L.; B.A. (Maryland), M.A. (Sydney), Ph.D. (Australian National U.). Professor of Theology—1967.

Sydor, L. P.; B.A. (Western Ontario), Ph.D. (Princeton). Associate Professor of Economics—1972.

Symons, David T.A.; B.A.Sc. (Toronto), A.M. (Harvard), Ph.D. (Toronto). Associate Professor of Geology—1970.

Szamosi, Geza; Ph.D., D.Sc. (Budapest). Professor of Physics—1964.

Tamburini, James J.; B.Mus. (Curtis Inst.). Assistant Professor of Music—1969.

Taylor, C. Maurice; B.A. (Toronto), S.T.B. (U. of St. Michael's College), M.A. (Middlebury College, Mainz), M.A. (Windsor). Assistant Professor of German Language and Literature—1966.

Taylor, Patricia Ann (Mrs.); B.A. (Assumption), B.S.W., M.S.W. (Toronto). Assistant Professor of Social Work—1968.

Teiling, Bernard; M.Sc. (Paris), Ph.D. (Ecole Centrale de Paris). Assistant Professor of Computer Science—1970.

Temelini, Walter J.; B.A., M.A., Ph.D. (Toronto). Assistant Professor of Hispanic and Italian Studies—1970.

Temple, Anna (Mrs.); B.Sc.N. (Windsor), M.N. (Wayne State), Reg.N. Assistant Professor of Nursing—1971.

Temple, Murray Clarence; Diploma (RMC, Kingston), B.A.Sc. (Toronto), S.M. (M.I.T.), Ph.D. (Toronto). Assistant Professor of Civil Engineering—1969.

Tewari, Pansy C. (Mrs.); B.S.N., M.Sc., (McGill), Reg. N. Assistant Professor of Nursing—1970.

Theuws, Jacques Antoine; 1st and 2nd Lic. (Louvain), Doct. (Witwatersrand). Professor of Anthropology—1971.

Thibault, Albert A.; A.B. (Boston College), L.es L. (Paris), M.A. (Harvard), D. es L. (Laval). Professor of French Language and Literature—1953.

Thibert, Roger Joseph; B.A. (Western Ontario), M.S. (Detroit), Ph.D. (Wayne State). Professor of Chemistry—1953.

Thomas, Barbara Campbell (Mrs.); Dip.P.H.N., B.N.Sc. (Queen's), Reg.N. Lecturer in Nursing—1969.

Thomas, Donovan DesSauges; B.S. (Natal), M.S., Ph.D. (Florida). Assistant Professor of Biology—1968.

Thomas, Paul; B.A. (Western Ontario), M.S. (Michigan), Ph.D. (Southern California). Professor of Physical and Health Education—1969.

Thomas, Paul Alexander Vivian; B.Sc.Eng. (London), Ph.D. (Glasgow). Professor of Electrical Engineering—1962.

Thompson, Dorothy G.; B.A. (British Columbia), M.A. (Stanford). Lecturer in History—1971.

Thompson, Laurel; B.A. (Mount Allison), B.A., M.A. (York). Lecturer in English—1969.

Tisdale, James C.; B.A. (Windsor), M.Ed. (Wayne State). Assistant Professor of Education—1966.

Titiev, Janice G. (Mrs.); A.B., M.A. (Michigan). Assistant Professor of Spanish and Portuguese—1971-72.

Tracy, Derrick Shannon; B.Sc., M.Sc. (Lucknow), Sc.D. (Michigan). Professor of Mathematics—1965.

Traynor, Tim Eden; B.A., M.A. (Saskatchewan), Ph.D. (British Columbia). Assistant Professor of Mathematics—1971.

Trenhaile, Alan S.; B.Sc., Ph.D. (Wales). Assistant Professor of Geography—1969.

Trott. D. Merilee (Mrs.); B.A., M.A. (Western Ontario). Assistant Professor of Psychology—1968.

* Tucker, Henry Joseph; B.Eng., M.Eng., Ph.D. (McGill). Associate Professor of Mechanical Engineering—1960.

Turek, Andrew, B.Sc. (Edinburgh), M.Sc. (Alberta), Ph.D. (Australia National U.). Associate Professor of Geology and Chemistry—1971.

Vandall, Paul Ernest; B.A., M.A. (Western Ontario). Associate Professor of Geography—1952.

Van Den Hoven, Adrian T.; B.A. (Assumption), M.A. (Windsor). Assistant Professor of French Language and Literature—1966.

van Wijngaarden, Arie; B.Sc., Ph.D. (McMaster). Associate Professor of Physics—1961.

Vincent, Rev. Claude L., C.S.B.; B.A. (Toronto), M.A. (Loyola). Assistant Professor of Sociology—1966.

Vuckovic, Milorad Nicolas; B.A., M.A. (Assumption), Ph.D. (McGill). Professor and Head, Department of History—1960.

Wagenberg, Ronald H.; B.A., M.A. (Assumption), Ph.D. (London). Associate Professor and Head, Department of Political Science—1964.

Wallace, Ronald W.; B.A. (St. Thomas), M.A. (New Brunswick). Lecturer in English—1971.

Wallen, Donald G.; B.Sc., B.Ed. (Dalhousie), M.Sc., Ph.D. (Simon Fraser). Assistant Professor of Biology—1970.

Warmuth, Clayton; B.Sc., M.Sc. (Toledo). Assistant Professor of Industrial Engineering—1970.

Warner, Alden Howard; B.A. (Maine), M.A., Ph.D. (Southern Illinois). Professor of Biology—1965.

Wassef, W. Youssef; B.A. (Cairo), M.S.W., M.A. (Washington), Ph.D. (St. Louis). Associate Professor of Social Work—1967.

*On leave.

Officers of Instruction

*Watson, Edward A.; B.A. (Howard), M.A. (Chicago), Ph.D. (Toronto). Associate Professor of English—1966.

Watt, Daniel Frank; B.Sc. (Alberta), Ph.D. (McMaster). Assistant Professor of Engineering Materials—1969.

White, Terrence H.; B.S. (Wisconsin), M.A. (Michigan). Assistant Professor of Sociology—1971.

White, Walter LeRoy, D.F.C.; B.A. (Western Ontario), M.A. (Toronto), Ph.D. (Michigan). Professor of Political Science—1956.

Whitehurst, Robert N.; B.A. (Butler), M.S., Ph.D. (Purdue). Associate Professor of Sociology—1969.

Wieden, Fritz; B.A., M.A. (Western Ontario), Ph.D. (Toronto). Professor and Head, Department of Germanic and Slavic Studies—1968.

Wigley, Neil M.; B.A., Ph.D. (California). Associate Professor of Mathematics—1970.

Wilkinson, Rev. Peter Frederick; B.A., M.A. (Toronto), L.Th. (Wycliffe). Associate Professor and Head, Department of Philosophy—1962.

Wilson, David A.; B.Comm. (Assumption), M.B.A. (Michigan), C.A. Associate Professor of Business Administration—1966.

Wilson, Mrs. Margaret Baird; B.S.N. (British Columbia), M.N. (Washington), R.N. Associate Professor of Nursing—1968.

*Winner, John Michael; B.S., M.S. (Notre Dame), Ph.D. (Massachusetts). Associate Professor of Biology—1963.

Wong, Chi Song; B.S. (National Taiwan U.), M.S. (Oregon), M.S., Ph.D. (Illinois-Urbana), Assistant Professor of Mathematics—1971.

Wood, Gordon Walter; B.Sc, M.Sc. (Mount Allison), Ph.D. (Syracuse). Associate Professor and Acting Head, Department of Chemistry—1963.

Woodyard, H. Dale; B.A., M.A. (Roosevelt), Ph.D. (Florida). Assistant Professor of Psychology—1968.

Wurfel, David; B.A. (San Diego), M.A. (California), Ph.D. (Cornell). Professor of Political Science—1968.

Youdelis, William V.; B.Sc. (Alberta), M.Eng., Ph.D. (McGill), Professor and Head, Department of Engineering Materials—1965.

Zakon, Mrs. Batia; M.A. (University of Wilno). Associate Professor of Russian—1958.

Zakon, Elias; Mgr. Phil., Dr. jur. (Stefan Batory U., Wilno). Professor of Mathematics—1957.

Zin, Michael; B.Comm. (Assumption), M.B.A. (Michigan), Ph.D. (Michigan State). Professor of Business Administration—1956.

*Zischka, Kurt Anton; M.A. (Frankfort), D.Sc. (Darmstadt). Associate Professor of Mathematics—1966.

*On leave.

SESSIONAL, VISITING, AND PART TIME APPOINTMENTS

Agar, Joel W.; B.A. (Colgate), M.A., Ph.D. (Syracuse). Sessional Instructor, Department of Psychology—1971.

Asselstine, Harold S.; B.Sc., M.D. (McGill). Adjunct Professor of Chemistry—1969.

Baker, Georgina (Mrs.); Dip. P.H.N. (Toronto), Reg.N. Sessional Instructor in Nursing—1971.

Barat, Arthur M.; LL.B. (Western Ontario); of Osgoode Hall, Barrister-at-Law. Special Lecturer in Property—1966.

Benson, John; Special Instructor in Dramatic Art—1970.

Bickle, Jack; Fellow, I.S.T.D. Special Instructor in Dramatic Art—1970.

Bowers, Robert; Special Instructor in Dramatic Art—1970.

Braks, Jorma Gunnar; B.A.Sc., M.A.Sc. (Waterloo). Visiting Lecturer in Chemical Engineering—1972.

Brown, Barbara (Mrs.); Dip. N.S.A. (Windsor), Reg.N. Sessional Instructor in Nursing—1971.

Callaghan, Morley; B.A. (Toronto), Visiting Writer in Residence—1971-72.

Carpenter, Patricia (Mrs.).; A.B. (Oberlin), B.S. (Western Reserve), M.A., Ph.D. (Wayne State). Adjunct Professor of Psychology—1969.

Comiskey, Lila Mae; Dipl. Pub. Health, B.Sc.N. (Western Ontario), Reg. N. Sessional Instructor in Nursing—1969.

Cosgrove, Brian D.; B.A. (Queen's, Belfast), B. Litt. (Oxon). Visiting Assistant Professor of English—1971.

Courey, Gabriel J.; B.Comm. (Assumption), LL.B. (Osgoode), LL.M. (Michigan); of Osgoode Hall, Barrister-at-Law. Special Lecturer in Taxation—1969.

Crerar, J. Ross; B.A.Sc. (Toronto). Special Lecturer, Faculty of Applied Science—1968.

Cundari, Emilia; B. Mus., B.A. (Marygrove). Special Instructor in Music—1971.

Daly, Joan F. (Mrs.); B.S., M.S. (Loyola). Assistant Professor of Psychology—1967.

Davis, Mary W. (Mrs.); B.S. (Michigan State). Sessional Instructor in Geology—1971.

Dingler, Daniel W.; B.F.A. (Layton School of Art), M.F.A. (Cranbrook Academy of Art). Sessional Instructor in Fine Art—1971.

Draisey, Thomas F.; M.B., Ch.B. (Bristol). Adjunct Associate Professor of Chemistry—1969.

Duce, Graciela; B.A. (Tulane), M.A. (Columbia). Visiting Assistant Professor of Sociology—1971-72.

Felver, Eleanor; L.R.A.M. (Royal Academy of Music, London). Special Instructor in Music—1968.

Franklin, Ivan; C.A. (Ontario). Sessional Instructor in Business Administration—1970.

From, Alvin D.; B.A. (Toronto), LL.B. (Osgoode); of Osgoode Hall, Barrister-at-law. Special Lecturer in Civil Procedure—1971.

Gallant, Romeo; on loan to the Faculty of Education from the Windsor Separate School Board—1971.

Gold, Susan B. (Mrs.); B.A., M.A. (Wayne State). Sessional Instructor in Fine Arts—1970.

Gram, James P.; B.A. (Western Ontario), Ed.M. (State U. of N.Y.). Visiting Professor of Education—1971.

Hancock, Walton M.; B.E., M.Sc., Dr. Engin. (Johns Hopkins). Adjunct Professor of Industrial Engineering—1968.

Harder, Helga; B.A. (Western Ontario), M.A. (British Columbia). Sessional Instructor in English—1970.

Hauptman, Susan A.; B.F.A. (Michigan), M.F.A. (Wayne State). Sessional Instructor in Fine Arts—1971.

Henderson, Grace; A.T.C.M. (Toronto). Special Instructor in Music—1971.

Hyde, Trevor; M.B., Ch.B., M.D. (Liverpool), M.C. Path. (United Kingdom). Adjunct Assistant Professor of Chemistry—1969.

Imber, Murray; B.S. (Illinois), M.S., Eng.S.D. (Columbia). Visiting Professor of Mechanical Engineering—1970.

Irwin, Joyce (Mrs.); B.Sc.N. (Windsor), Reg. N. Sessional Instructor in Nursing—1968.

Klink, Sharon Joy (Mrs.); B.Sc.N. (Western Ontario), Reg. N. Sessional Instructor in Nursing—1969.

Leach, Mary (Mrs. J.); B.H.Sc. (Guelph), R.P.D.T. Special Instructor in Home Economics—1970-71.

Linton, Margaret (Mrs.); B.Sc.N. (Western Ontario), Reg. N. Sessional Instructor in Nursing—1971.

Long, Kenneth; B.A., M.A. (Windsor). Sessional Instructor in English—1968.

McElhone, Dorothy (Mrs.); B.Sc.N. (Windsor), Reg.N. Sessional Instructor in Nursing—1971-72.

MacLean, Charles A.; B.Comm. (Assumption), M.B.A. (Michigan), C.P.A. (Michigan). Sessional Instructor in Business Administration—1966.

MacMillan, Angus Richard; B.A. (Toronto); of Osgoode Hall, Barrister-at-Law. Sessional Instructor in Business Administration—1970.

Magee, Joan; B.A. (Western Ontario), B.L.S., M.L.S. (Toronto). Sessional Lecturer in Scandinavian Studies—1972.

Makowski, Raymond; B.Ed. (Toledo), M.Ed. (Wayne State). Special Instructor in Music—1971.

Mann, Audrey C. (Mrs.); B.Sc. (Ed.), M.A. (Ed.) (Columbia). On loan to the Faculty of Education from the East York Board of Education—1971.

Masterson, Patrick; B.Comm. (Windsor), M.A. (Wayne State). Sessional Instructor ir Communication Arts—1971.

Mitchell, Patricia J. (Mrs.); B.F.A. (Illinois Wesleyan), M.A. (Iowa). Sessional Instructor in Fine Art—1971.

Miller, James; Ph.D. (Wayne State). Special Instructor in Dramatic Art—1970.

Momotiuk, Harry; B.B.A. (Detroit), LL.B. (Ottawa). Sessional Instructor in Business Administration—1970.

Monoghan, Stanley; B.A. (Windsor), M.S.W. (Carleton). Sessional Instructor in Social Work—1971.

Murty, M. K. S.; Visiting Assistant Professor of Civil Engineering—1971.

Myers, Robert J.; B.S. (Western Ontario), B.S.W. (Toronto), M.S.W. (British Columbia). Sessional Instructor in Social Work—1969.

Ostiguy, Raymond J.; B.A. (Carleton), LL.B. (Queen's); of Osgoode Hall, Barrister-at-Law. Special Lecturer in Landlord and Tenant—1970.

Papiz, Carol A. (Mrs.); B.Sc.N. (Assumption), Reg. N. Sessional Instructor in Nursing—1969.

Philipp, Rudolph; B.A. (Sir George Williams), M.A. (McGill), Ph.D. (Queen's). Sessional Instructor, Department of Psychology—1971.

Poisson, Mary Lou (Mrs.); B.S.N. (Marillac, Missouri), Reg. N. Sessional Instructor in Nursing—1970.

Primorac, Emile; B.A., M.Comm. (Toronto), Ph.D. (London). Visiting Associate Professor of Economics—1971.

Radigan, Edith; B.Sc.N. (Windsor), Reg.N. Sessional Instructor in Nursing—1971.

Reavey, Marion; M.S.W. (Wayne State). Sessional Instructor in Social Work—1969.

Richards, Mary Helen; B.Mus. (Nebraska). Special Instructor in Music—1971.

Riffel, Pius A.; B.A. (Loyola), M.A., Ph.D. (Fordham). Adjunct Professor of Psychology—1969.

Rosenbaum, Janet (Mrs.); B.Sc.N., Reg. N. (Wayne State). Sessional Instructor in Nursing—1970.

Rozsnyai, Arlene (Mrs.); M. Mus. (Yale). Special Instructor in Music—1970.

Rusk, Bruce A.; B.A., M.A., (Toronto), M.Sc. (Illinois). Visiting Lecturer in Education—1971.

Skimson, Carolyn (Mrs.); B.Sc.N. (Windsor), Reg.N. Sessional Instructor in Nursing—1971.

Sweeney, Sister Fleurette; A.R.C.T. (Toronto), B.A. (British Columbia). Special Instructor in Music—1971.

Stoyka, Michael F.; B.A. (Assumption), LL.B. (Osgoode), LL.M. (London); of Osgoode Hall, Barrister-at-Law. Special Lecturer in Advanced Taxation—1970.

Utukuri, R. R. Narendra; B.Sc. (Behar), M.E. (I. I. S., Bangalore), Ph.D. (Waterloo). Visiting Assistant Professor of Electrical Engineering—1970.

Vander Pol, Hendrik; B.Sc. (Guelph), M.B.A. (Toronto). Lecturer in Business Administration—1971-72.

Vandervaart, Robert B.; B.A. (Western Ontario). Sessional Instructor in German—1971.

Walker, Richard R., Q.C.; B.A. (Toronto), LL.B. (Osgoode); of Osgoode Hall, Barrister-at-Law. Special Lecturer in Estate Planning—1970.

Weingarden, Arthur B.; B.A. (Assumption); of Osgoode Hall, Barrister-at-Law. Sessional Instructor in Business Administration—1960.

Wigley, Ute; Law Degree (Staats examen) (Kiel), Admission to the Bar (Assessor examen), Dr. jur. (Mainz). Special Lecturer in Computers and the Law—1970.

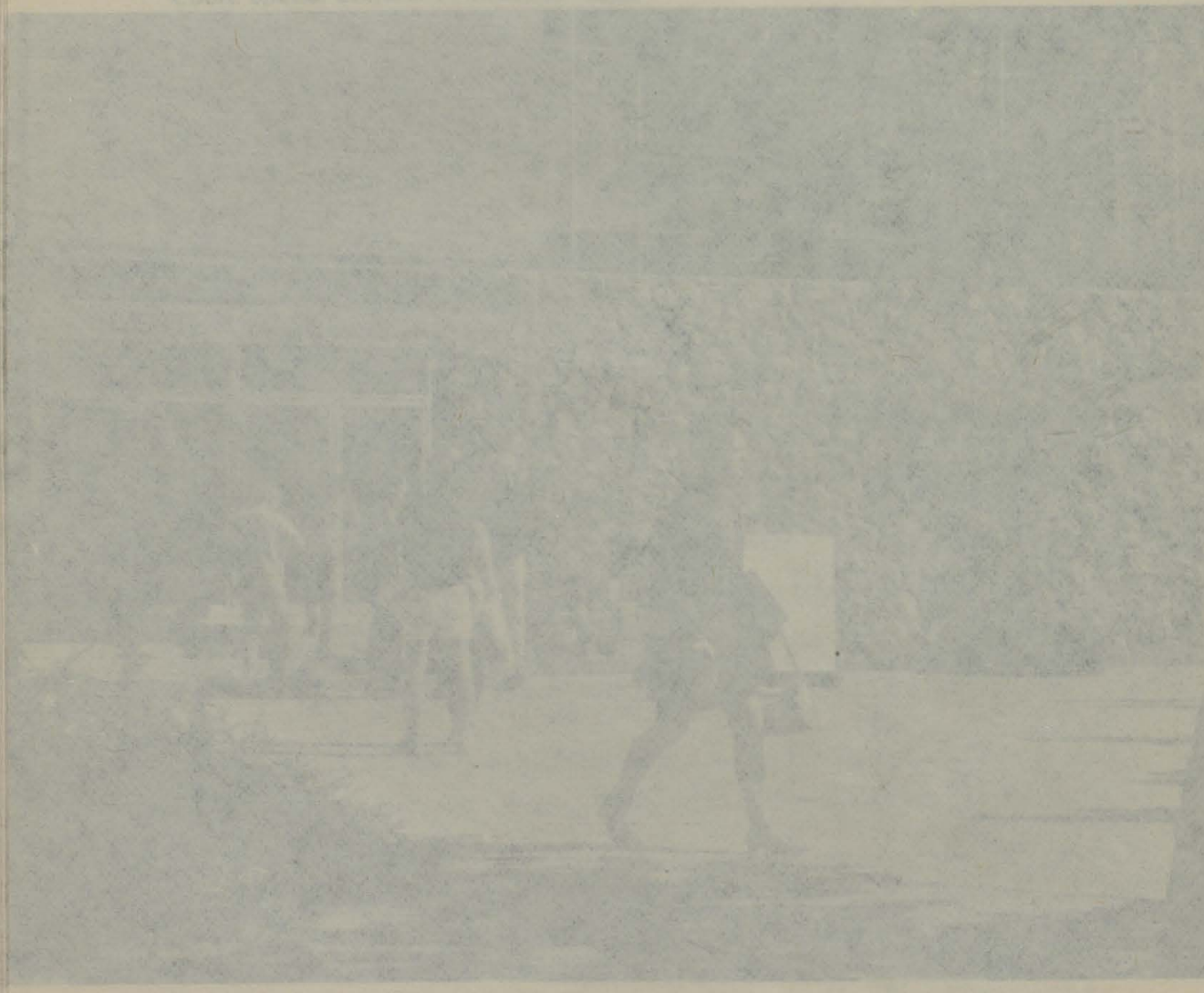
Wunder, Martin; B.A. (Western Ontario), LL.B. (Osgoode); of Osgoode Hall, Barrister-at-law. Special Lecturer in Trial Advocacy—1971.

Zalev, Carl, Q.C.; B.A. (Assumption), LL.B. (Osgoode); of Osgoode Hall, Barrister-at-law. Special Lecturer in Civil Procedure—1971.

Zuber, His Honour Judge Thomas G., Q.C.; B.A. (Assumption). Judge of the County Court. Special Lecturer in Evidence—1968.

PART C

GENERAL INFORMATION



GENERAL INFORMATION

I. CAMPUS LIFE

At the University of Windsor, the curriculum is complemented by a program intended to give expression to the social, moral, and physical capabilities of students, giving everyone an opportunity to derive the maximum personal benefit from and to contribute to the University community.

The Office of Student Affairs, situated in Vanier Hall, supervises the co-curricular interests of students on campus through the complementary program, directing counseling, social and cultural activities, conduct and discipline, job placement, and temporary housing. The Student Affairs Office works with student organizations to insure their representation and to maintain an academic community governed by traditionally reasonable modes of conduct, dedicated to the development of a responsible, enlightened citizenry. Each year the Office of Student Affairs publishes a Student Handbook for general reference.

The University Centre and Vanier Hall

The University Centre, at the hub of the campus, provides facilities which include a cafeteria, lounges, and a snack bar on the main floor. The ground floor houses a bank, the student radio station, women's locker rooms, and a commuters' lunch area known as 'The Grotto'. On the second floor are the Students Administrative Council Office, and the Student Press.

The University Library

The university library system consists of the General Library, the Paul Martin Law Library, an autonomous, associated library situated in the Faculty of Law Building; and the Education Library, a branch of the General Library, housed in the Faculty of Education Building. The principal objectives of the university library system are to develop sound and balanced collections in support of instructional and research programs, and to provide reference and information services to assist the university community in making maximum use of materials available. A policy of open access to the collections affords the reader opportunity to browse at leisure, or to exploit the literature of his field of special interest in depth.

With the recent completion of the new University Library building, the combined facilities provide space for about 1,200,000 volumes. Seating is available for 2,150 readers in a variety of general seating facilities, open and closed carrels, and seminar rooms.

The University Bookstore, providing text book and a large selection of enrichment reading materials, and accessible through its own separate entrance, occupies the entire ground floor of the West Library Building.

In December 1971 the collections contained 525,000 volumes, growing at an annual rate of about 60,000 volumes. Over 9,000 current periodicals and serials are received, including important newspapers, both foreign and domestic. In addition, the University library system has extensive collections of Canadian federal and provincial government documents and publications of major international organizations, and participates with other academic libraries in the Windsor-Detroit area in a program of collective acquisitions, serving as the resource centre for Canadian materials for cooperating institutions, while Detroit libraries serve as resource centres for similar government publications of the United States and Great Britain. A complete range of photocopying and microform reading and copying facilities is available.

Through the General Library, the associated libraries are members of the Inter-University Transit System which enables them to provide relatively easy and rapid access to materials in other Ontario university libraries and, in turn, to make available their own resources to the larger Ontario academic community. On December 1, 1969, the academic libraries of the Province of Quebec inaugurated their own transit system which links up with the Ontario I.U.T.S. in Ottawa. As a result, the fourteen Ontario universities and the ten Quebec universities (soon to be increased in number as the newly-founded Universite de Quebec develops), plus the National Library and the National Science Library, both in Ottawa, freely exchange resources by rapid delivery service on a daily basis throughout the year.

A formalized orientation program consisting of video-taped and live lectures and demonstrations is provided to all first year students by the Coordinator of Library Orientation. Lectures on research resources and procedures are given by specially qualified members of the staff to upper-classmen and graduate students in a number of departments. These programs are designed to facilitate maximum usefulness of the collections to the university community as well as to provide a mechanism for feedback to the Library staff to evaluate the relevance of their operations, and to enable the library system to continuously improve its performance in the total educational and communication process.

Student Government

Student organizations and activities are a vital part of life at the University. The initiative in these organizations and the direction of their activities are in the hands of the students and are regulated mainly through student government which includes all students in its membership. The Students' Administrative Council works with all other organizations to maintain vitality and a constructive community life.

Clubs

Interest groups employ the facilities of the University Centre and Vanier Hall for their organizational base, presenting debates, ethnic interest programs and club meetings. The campus organizations provide social, religious, cultural and recreational opportunities and experiences. For students having special abilities and interests there are departmental clubs, national and local organizations, and inter-collegiate teams. None have restricted membership. Electa Hall provides space for extra curricular studies in arts and crafts for women students.

Campus Radio

The students operate a campus radio station airing music, news, sports and campus information. The station is on the ground floor of the University Centre and serves Electa, Cody, Huron and Macdonald residences, as well as the Centre. The station broadcasts twenty-four hours, seven days a week. The station offers live coverage of major away games of the football and basketball Lancers.

The Graduate Student Society

The Graduate Student Society was recognized on January 30th, 1964, and serves as the consolidating body for the views of the post-graduate students. An inter-disciplinary exchange encourages the gathering together of graduate students from the various faculties for educational and social activities making them aware of the full range of academic, cultural and social opportunities available through the University. The Society sponsors lectures by specialists in varied fields of graduate interest with the intention of promoting inter-disciplinary awareness and understanding. The office is located in Vanier Hall.

Athletics

Realizing the value of a balanced regimen of exercise and play as part of the total education process, the University fosters an athletic program which is both recreational and competitive. Approximately eighty per cent of the students participate in extensive intramural programs for both men and women involving some eighteen sports. While under the supervision of the Director of Athletics, these programs are operated by the students who participate. For those who excel athletically there is opportunity for competition within the Ontario-Quebec Athletic Association.

Special Events

Each year brings an increase in the variety and number of special events scheduled on campus or through campus organizations. The well-established Christian Culture Series, conducted by the federated Assumption University, brings outstanding lecturers and artists to the area throughout the academic year.

The Music Department and the School of Dramatic Art offer diverse programs to please students and members of the local community.

These programs include the University Band and Orchestra, the Pep Band, the University Players, the University Singers, and occasional experimental theatre. Further information can be obtained from the Head of the Music Department or the Director of the School of Dramatic Art.

II. STUDENT SERVICES

Counselling

To help in the achievement of fuller personal development, of intelligent career choices, and of intellectual freedom and satisfaction within the challenging educational framework, the University provides students with counselling services commensurate with their particular needs: educational, vocational, moral, social or religious.

Academic and Personal

Students are invited to consult the staff of the Office of Student Affairs for assistance in personal matters, and for counsel related directly to their University community and to their studies.

Financial

Consultation regarding financial assistance, with particular reference to awards, student loan funds, and the Canada Student Loan, may be obtained from the Awards Office. The University recognizes that some students must supplement their income by part-time employment during the academic year, but unless such employment is kept to a minimum both health and academic standing could suffer. In the event that a student is required to take a reduced study program, he might be better advised to postpone his higher education until he can afford to devote full time to the many facets of university life which contribute to a balanced educational pattern.

Religious

Although the University is non-sectarian in its support of campus religious life, it is aware of the importance of ethical and moral influences in the development of the individual. Students, therefore, have access to the spiritual counsel of chaplains representing various denominations.

Psychological Centre

The Psychological Centre provides professional services to individuals who wish to understand themselves better and to use their resources more effectively. The Centre offers programs in career planning, discussion groups, psychotherapy, reading and study skills, personal resource assessment, tension control, and a self help program.

The Centre is staffed with the equivalent of five Clinical Psychologists with a doctoral degree, and four Psychometrists and Counselors at the Masters level. Professionals from Psychiatry, Social Work, and other related fields provide consulting service.

Medical Facilities

Medical Office—The University has a medical office, with a physician to advise and counsel students who are in need of care, therapy or hospitalization. First-aid stations, for the treatment of minor injuries, are distributed throughout the University buildings. An infirmary is located in Cody Hall.

Health and Hospitalization—Students are required to submit a certificate of medical examination as part of the routine admissions procedure. Those students participating in athletics must also submit annual medical certificates. The University does not assume responsibility for expenses incurred as a result of injuries sustained by students on campus. Further information about the University's accident insurance plan may be obtained from the Office of Student Affairs.

Placement

Job-seekers, whether they need summer work, part-time work during the academic year, or permanent employment upon graduation, are assisted by the campus Placement Officer, who is appointed by the Canada Manpower Centre. During the year interviews with prospective employers from business, industry and education are arranged for students who are registered with the Placement Office.

International Students

The University's concern for the large overseas student population has prompted the establishment of an International Students' Organization, in cooperation with the Students' Administrative Council. The inter-cultural exchange has proven invaluable to all engaged in the development of the program. Over three hundred scholars are enrolled each year, representing nearly thirty countries.

In 1968, the International Centre was opened. This Centre, which is located in the middle of the campus, provides an educational and social milieu for overseas students.

III. RESIDENCE ACCOMMODATION

Traditionally the University residence halls house about one quarter of the University's student population which comes from outside the city, representing various regions across Canada, many overseas countries, and the United States. Such a cosmopolitan environment produces important cultural and social by-products enjoyed by all members of the University community.

Residence housing is administered by the Office of the Director of Residences.

Scholastic endeavour is particularly emphasised in the residence halls on campus, where the atmosphere is expected to contribute to personal and social expansion. It is recommended that all new students in their first year of study live in a residence provided by the University or by one of its federated or affiliated colleges.

Those interested in residence accommodation should note that fact on the University of Windsor academic form. When the student is accepted, the Admissions Office will send out a residence application which the student should return to the Office of the Director of Residence.

When the Office of the Director of Residence is notified that residence is required, the applicant will receive additional information concerning residence hall policies and will be notified of assignment status.

Off campus housing information is handled through the Office of the Director of Residences.

The University of Windsor and its affiliates own and/or operate a total of seven residences for men and women, plus a central food complex to service these residences. They are:

Electa Hall—Built in 1958 with a larger addition in 1963, this women's residence is located on the north side of the main campus and can accommodate 225 female students in double and single rooms.

Sir Wilfred Laurier Hall—This residence is part of the central residence complex located on the south side of the main campus and will accommodate 356 female residents.

Sir John A. Macdonald Hall—Similar in structure and location to Laurier Hall, this ten storey men's residence was completed in 1967 and is now entering its fifth year of operation. Both Laurier and Macdonald Halls are directly adjacent to Vanier Hall.

Cody Hall—This residence was built in 1962, and can accommodate up to 210 male residents in a five storey structure on the south side of the main campus.

Huron Hall—This residence, purchased in 1968, is located approximately one block from the main campus on the new south campus, and has a capacity of 210 male students in double rooms.

Tecumseh Hall—Radical in concept and design, this residence is situated directly west of Huron Hall. It was constructed in 1971 and can accommodate 186 students in forty-one units consisting of two, three and four bedroom apartments. Each apartment unit contains its own kitchen, living room, dining room, bathroom and bedrooms. Emphasis is on privacy and group living and may well begin a trend in University housing of the future.

Assumption University (a federated institution) provides space for 50 male graduate students in **St. Michael's Hall**. For information, write to: The Director of Residences (University of Windsor).

Canterbury College operates **Geoffrey Fisher Hall**, a residence for married students, and other houses for graduate and undergraduate students. For information, write to: The Bursar, Canterbury College, University of Windsor.

FEES

Fees are subject to change without notice. All fees are for the academic year, except where otherwise indicated. Fees listed are for Canadian students; for non-Canadian students, see below*.

FULL TIME - Undergraduate

Any undergraduate student (regular or special) taking four courses or more will be charged the fee for full time attendance.

The following schedule lists the **minimum** amounts payable, including registration, tuition, library, laboratory, examination, university centre, health service, insurance, student government and activities fees, and professional society fees.

Extra course fee: Any full time student who enrols in courses which are additional to the minimum requirements for his program as outlined in this calendar, will be charged the fee for each additional course at the rate for part time students (see below).

Preliminary Year $580
Music, Fine Arts, Nursing, Communication Arts 550
(School of Nursing Advance Placement Examination Fee $10)
Social Work 545
Dramatic Art 550
(Applicants for the B.F.A. program will be charged audition fee of $10)
Arts (General, Honours, Makeup) 545
Science (General, Honours, Makeup) 555
(Students taking Geology 480c pay additional fee of $60 for Field Camp)
Computer Science 555
Physical and Health Education 555
Commerce 545
Engineering 620
(Students taking C.E. 301 pay an additional fee of $40 for C.E. Camp)
Law 560
Education 527.50
(First installment of 277.50 payable at registration; the first installment of the Teacher Education Award will be distributed to students in early December).

PART TIME—Undergraduate (Day or Extension)

Lectures:

Full course (3 or more hours a week) $142.50
Half course (equivalent of one semester, 3 or more hours a week) 71.25
Full course (2 hours a week) 100.00
Half course (equivalent of one semester, 2 hours a week) 50.00

FULL TIME - Postgraduate (per annum) $530
(This includes tuition, and incidentals such as registration, library, laboratory, examinations, Graduate Student Society membership.)

PART TIME—Postgraduate (per course) 142.50
(In no case will the minimum **total fee** be less than $530 for each year of required residency)

If a student registers in the year beyond required residency under the Master's program on a **full time** basis, the minimum fee will be $142.50 plus $45 incidental fees on an annual basis. For **part time** Master's students registering beyond required residency the minimum fee is $142.50 plus incidental fees of $25 on an annual basis. For any doctoral year past the required residency period, the minimum tuition fee will be $150 plus $45 incidental fees per annum.

All courses taken in addition to the residency requirements in Master's and doctoral programs will be charged the appropriate fees.

NOTE: This is the graduate fee situation at the time of Calendar printing. It is subject to sudden change without advance notice in view of amendments resulting from the present study on graduate fee structure in the Province of Ontario.

MISCELLANEOUS FEES

Payable by all students as incurred.

Language laboratory fee	$10.00
All other laboratory, clinical experience, seminar, tutorial and field work fees	30.00
Audition fee for First Year Dramatic Art students	10.00
Late Registration: Full-time	$20.00
Part-time	5.00
Graduate Record Examination	12.50
Graduate Student Society Fee	$5.00 yearly
Special and supplemental examination, per subject:	
Regular time and place	10.00
Outside regular time and/or place	20.00
Change of course	5.00
Transcript of record (Official)	1.00
(Unofficial)	.50
Evaluation of documents	10.00
Graduation fee	8.00

(Payable by students in their graduation year; this includes the purchase of gown, diploma and diploma case; and hood for all except doctoral candidates.)

***ADDITIONAL FEE FOR NON-RESIDENTS OF CANADA**

(Applies to all foreign students. Needy students from overseas developing countries may request that this fee be waived; such requests should be made in writing, on application for admission, which is to be completed by July 1).

Full time students	$100
Part time students	$20 per subject

PAYMENT OF FEES

As a convenience, students may pay their fees at any time in advance of registration day. Fees are due and payable on the day of registration; they may, however, be paid in two instalments (except overseas students who must pay in one payment) in which case a carrying charge of $5.00 is made. The first instalment is due at the time of registration: the second instalment is due on or before January 16, 1973. A penalty of **$10.00** will be assessed students paying the second instalment after January 16, 1973, and an additional $5.00 a month for each month the fees are not paid.

Remit fees by certified cheque, money order or personal cheque drawn on your own bank and branch, payable to the University of Windsor in Canadian funds. Returned cheques are subject to a $5.00 penalty.

Students who wish to pay fees under the Ontario Student Award Plan (O.S.A.P.) must have their Certificate of Eligibility for registration day, or else pay the first instalment of their fees.

Scholarships and other awards made available by the University and paid to students through the Director of Finance Office will be credited to the student's account. A cheque for the remaining balance, if any, will be given to the student at the Cashier's Office:

First instalment after November 15, 1972
Second instalment after January 15, 1973

Income Tax certificates will be issued as of the end of January 1973 for the ACADEMIC fee only. These will cover the academic year, and should be kept for income tax returns. They will be distributed by mail by February 15, 1973.

A reduction is made in the tuition fees of brothers and sisters attending the University simultaneously as full-time students.

REGULATIONS REGARDING NON-PAYMENT OF FEES AND CHARGES

(a) All information concerning academic results of any student having an overdue debt owing to the University shall be withheld until the debt is settled.

(b) Any student who has an overdue debt owing to the University will not be permitted to re-register until the debt is settled.

(c) Any student who has an unresolved grievance concerning fees or other charges may file an explanatory letter to the Supervisor, Cashier's Office.

WITHDRAWAL AND REFUND POLICY

Students who are forced to withdraw from a course or from the University are required to **notify the Registrar in writing** and to give their reasons for withdrawal. The obligation of teaching and accommodating a student rests on the University on a yearly basis. Hence:

(1) **All tuition credits or refunds shall be made entirely at the discretion of the University.**

(2) Applications for credit or refund will be accepted only in the following cases:

(a) where the student is compelled to withdraw on account of serious and continued personal illness (medical certification will be required);
(b) where the student is compelled to withdraw for other personal reasons, with the approval of the Dean of the Faculty.

(3) Normally, the portion of the fee credited or refunded is determined by the date application for refund is received (NOT THE DATE OF WITHDRAWAL), according to the following schedule:

	Amt. of Credit or Refund
Withdrawal prior to the second week of classes	100% less $25
Withdrawal during the second week of classes	80%
Withdrawal during the third week of classes	60%
Withdrawal during the fourth week of classes	40%
Thereafter	No refund

The President may make adjustments to these regulations when unusual circumstances warrant such action.

RESIDENCE FEES

Room and Board—Will vary with plan selected. Prices on application.

An extra charge of $5 for dining contract and $5 for room contract is made if the fee is paid in two instalments. In addition, each resident student must pay to the University prior to September 1, a caution fee of $30 which will be refunded if the reservation is cancelled before August 15.

The Residence Council has a right to place a levy against the caution fee for the social and miscellaneous needs of the residences. The remainder will be returned to the student at the end of the academic year providing additional assessments are not required.

A student who withdraws from residence during the academic year may receive a refund only when such withdrawal is occasioned by circumstances beyond the control of the student and has the prior approval of the Director of Residence.

UNDERGADUATE AWARDS AND FINANCIAL AID

1. AWARDS:

The term **"Award"** is a general designation applied to any citation, medal, gift or grant of money presented to a student.

The President's Roll of Scholars includes all those students who, in the preceding academic year have achieved First Class Honours or its equivalent. Such students receive Certificates of Merit.

Scholarships are awards made in recognition of academic excellence and general proficiency. They may take the form of a monetary allowance or a proficiency medal or in some cases both.

Prizes are awards made in recognition of outstanding scholastic achievement or proficiency in a specific area.

Bursaries and Grants are monetary awards made on the basis of satisfactory standing and financial need. Students who are experiencing financial need are advised to seek assistance through government aid plans.

2. LOANS:

Students who have satisfactory scholastic standing and who demonstrate financial need have access to loan funds to assist them with emergency financing. Loans are repayable according to the terms of a definite agreement. (See page C-28).

3. CLASSIFICATION:

The awards and other forms of aid that are listed below are organized into Sections A, B, and C.

Section A includes all awards administered by the University.
Section B lists several awards which, although not under the control of the University, are available to its students.
Section C lists loans and other forms of aid.

For further information on available awards the following sources are recommended:

1. Guidance Officers in Secondary Schools;
2. Awards Office of the University;
3. Dominion Bureau of Statistics publication "University Entrance Awards", copies of which are available in the University Library.
4. Director of Awards, Association of Universities and Colleges of Canada, 151 Slater Street, Ottawa 4.

4. APPLICATION FOR AWARDS

(a) Awards listed in Section A will be subject to the approval of the Senate of the University. Unless otherwise stated, no application for these, other than the application for admission to the University, is required. Students are encouraged to apply for admission as early as possible so that they will be considered when Entrance Awards are being assigned.

(b) For awards and other aid listed in Section B and C, students should obtain application forms from the administering agency indicated. The respective deadlines for applying are those required by the donors.

5. DECISIONS AND ANNOUNCEMENTS OF AWARDS:

The eligibility of a student for a University Entrance Award will be reviewed as soon as the application for admission is received. The decision of the Committee will be made in time to be included with the letter of acceptance to the student. Decisions on most other awards will be made prior to October 31 of the year in which the award is applicable.

6. PAYMENT OF FUNDS:

Awards under the jurisdiction of the University will ordinarily be paid or applied to academic fees in two instalments, one in each semester, provided that the recipients are continuing in their courses to the satisfaction of the University. If the work of the first term is unsatisfactory, payment for the second term may be withheld.

7. MULTIPLE AWARDS:

(a) The monetary benefits of awards administered by the University will be determined in relation to what is available to the student from government student aid plans and/or other awards which the student accepts. The University reserves the right to substitute all or part of its award by an equivalent award or awards.

(b) A student may be declared the winner of as many scholarships as he may win as a qualified candidate of merit, but, in case of awards involving a major financial amount, such student will normally receive only the largest among these major amounts.

(c) Winners of scholarships and prizes may resign the monetary value but retain the honour of such awards, and their names will be published as winners.

8. GENERAL:

(a) In order to be eligible to receive the monetary benefit of a University administered award, the student must satisfy the Awards Office that he is unable to receive a comparable amount of money from the Government Aid Plan in his province or state.

(b) A student who has received an award within the jurisdiction of the University will be expected to complete his course at this University, unless there are extenuating circumstances.

(c) Awards listed in Section A will be made by the Senate to qualified candidates of merit, and may be withheld if no candidate of merit presents himself.

(d) The University does not guarantee any award other than those created from the funds of the University. Those awards which are the gifts of outside donors are awarded only after the funds have actually been received.

(e) A student normally forfeits the monetary benefits of his award if he withdraws from the University before the end of the regular academic year. The Senate is given discretionary powers in the application of this regulation.

(f) Unless otherwise specifically stated, the term "satisfactory standing" shall be interpreted as meaning First Class Honours standing.

A. AWARDS ADMINISTERED BY THE UNIVERSITY

I. UNIVERSITY OF WINDSOR ENTRANCE AWARDS

The following regulations cover all University of Windsor Entrance Awards, except as otherwise indicated:

(i) Each applicant must have First Class Honours standing or the equivalent as determined by the University.

(ii) The student's secondary school record particularly in grades 11, 12 and 13, the Principal's confidential rating and the results of the Ontario Scholastic Aptitude Tests will form the basis for determining awards.

(iii) Each recipient must enroll in the University for the academic year immediately following the conferring of the award and must carry a full academic load according to the Calendar, or forfeit the award.

(iv) Some scholarships may be renewed for a maximum of four continuous academic years providing that the student carries a full academic load and maintains First Class Honours Standing.

(v) Since the University is now operating on a three semester system for some programs, an academic year will be defined as two consecutive semesters; continuous study will be defined as a minimum of two semesters out of three.

(vi) In the event that a recipient fails to meet these requirements or withdraws from the University for a year or more, he will lose the scholarship for the ensuing year, but he may regain it in a subsequent year.

The following is a list of Entrance Awards administered by the University.

University of Windsor Entrance Awards:

Several awards in amounts up to $600 or more are available to students entering First Year at the University. Some of these awards may be designated as renewable and will be renewed on the basis of the above regulations. The actual amount of the awards is determined on the basis of scholastic standing.

University of Windsor Alumni Scholarships:

Five or more scholarships having a maximum value of $500 each, renewable in amounts up to $500 according to the conditions stated above, awarded at entrance to students preferably from areas where Alumni Chapters exist.

Norah Cleary Entrance Awards:

Value: Tuition and all other fees except for room and board. (For details see Assumption University Awards, page C-18).

John B. Kennedy Memorial Entrance Awards:

Value: $300. (For details see Assumption University Awards, page C-18).

The General Motors Canadian Scholarship:

Total possible value $4,000.

An entrance scholarship valued at $1,000, renewable for three additional years or until graduation, whichever is the sooner, upon maintaining satisfactory standing (normally First Class Honours). To be awarded to a student of outstanding academic calibre who has demonstrated evidence of leadership and good social adjustment, and who shows a preference for a career in Business and Industry.

Steel Company of Canada Entrance Bursary:

Value $500 a year renewable for a maximum of four years, or until graduation, whichever is sooner. Recipient must be a permanent resident of Canada, must have completed the final year's work for university entrance in one school year and must have attained a minimum average of 66 per cent. Not tenable with other scholarships totalling in excess of $200.

Association of Professional Engineers Entrance Scholarship:

$500, awarded by the Ontario Professional Engineers Foundation for Education on the recommendation of the Faculty Council, to the Grade 13 pupil entering the Faculty of Applied Science in an accredited engineering course, with the highest Grade 13 standing of all pupils entering accredited engineering courses in the Faculty.

II. IN COURSE AWARDS

The following is a list of individual awards under the control of the University. The majority are In Course Awards. They are organized into various categories for convenience.

SCHOLARSHIP MEDALS

The Governor-General's Medal:

Awarded annually to a graduating student chosen by the Senate, on the basis of academic performance and contribution to university activities.

The Board of Governors Medals:

Awarded annually to students graduating with the highest standing in each of several courses, and to the undergraduates with the highest standing in each year, regardless of course.

ASSUMPTION UNIVERSITY AWARDS

The following awards held in trust by Assumption University are available to all students of the University of Windsor who can meet the requirements. The recipients are selected by the Senate of the University of Windsor.

The Major H. P. Swan Prize in Philosophy:

A prize of $50 awarded annually to the student in III or IV Year of an Honours program in Philosophy with the highest Honours average, or in II or III Year of the General Program majoring in Philosophy with the highest average in the subjects of his major.
Endowed by the late Major H. P. Swan (1966).

Dr. Roy J. Coyle Memorial Prizes:

Prizes of $50 each are awarded annually to the students with the highest standing in Biology 110 and Physics 113. Endowed by the late Dr. Roy J. Coyle, Windsor, Ontario.

Helena M. Coyle, B.A., Prize:

$50 annually as a prize to the student with the highest standing in English 115.

J. C. McGuire Bursary: Value $450.

Dr. Roy Coyle Memorial Bursary: Value $300.

Fred H. Anderson Memorial Bursary: Value $250.

Edmund Girardot Memorial Bursary: Value $200 to a graduate of a Roman Catholic High School in Essex County.

D. S. McIntyre Bursary: Value $200 to a graduate of a Roman Catholic High School.

Frank McIntyre Memorial Bursary: Value $200 to a graduate of a Roman Catholic High School.

Msgr. F. X. Laurendeau Memorial Bursary: Value $150 to a graduate of a Roman Catholic High School in Windsor.

John B. Kennedy Memorial Entrance Awards:

Value: $300. Two awards are made annually; one to a graduate of a Canadian, and one to a graduate of an American high school.

Renewable annually, provided satisfactory standing (normally First Class Honours) is maintained, to a total possible value of $1,200. Tenable with other entrance awards.

Established in 1963 through the benefaction of the late John B. Kennedy, to Assumption University.

Norah Cleary Entrance Awards:

Value: Tuition and all other fees except fees for room and board.

One or more awards made annually to students who have been attending for at least two years Windsor and Essex County High Schools (with preference to students of Patterson and Kennedy Collegiates). Applicants must have completed the entrance requirements for the degree course of their choice with satisfactory standing and must show need of financial assistance.

Renewable annually, provided satisfactory standing (normally First Class Honours) is maintained.

Established in 1963 through the benefaction of the late Miss Norah Cleary to Assumption University.

GENERAL AWARDS

The Hydro-Electric Power Commission of Ontario:

Value $500. Awarded to a second year student proceeding to an honours degree in any of the following areas: applied science and engineering, mathematics, physics, business administration, and/or commerce.

Paul Martin Award:

Value $400. To an undergraduate or a graduate student who has shown an active interest in Political Science, Law, or International Relations.

The H. Joseph McManus Scholarship:

Value $600. Awarded annually at the discretion of the Committee on Student Awards to a deserving student. Established in 1954.

McManus Memorial Classics Prize:

An annual award of $40 to the best student in Latin 112. Donated in memory of the late Patrick McManus of St. Thomas, Ontario, by his descendants, of whom 11 are Alumni of Assumption University.

Dr. Alfred E. Thomas, Sr., Memorial Award:

Value: $300. Awarded annually on the basis of scholastic standing and financial need to a deserving student in any year of any degree program. Established in 1962 by the late Dr. Alfred E. Thomas, Jr., in memory of his father.

Sister Mary Electa Award:

Value: $250. Awarded to a woman student in residence on the basis of satisfactory standing and need. Sponsored by University of Windsor Alumni Association.

Frank D. Brockenshire Memorial Prizes in Creative Writing:

Prizes to the amount of $100 are awarded annually for original contributions in prose and poetry. Donated by Mrs. F. A. Brockenshire.

Ann Anderson Piggott Memorial Award:

Value $350. Awarded annually to a Canadian student, on the basis of academic standing and financial need.

Beta Sigma Phi Sorority Award:

One or more awards valued at $150 to deserving female students who are residents of Windsor or Essex County and who have satisfactory academic standing.

American Women's Club of Windsor Award:

Value: $50. Awarded annually to a woman student, citizen of the United States, on the basis of scholastic achievement and financial need.

Gladys E. Campbell Memorial Fund Award:

$100 University of Windsor award to a female student. Established by the University of Windsor Women's Auxiliary.

Mitzvah Chapter B'nai B'rith Women Bursary:

Value $100. Awarded annually on the basis of scholastic ability and financial need to a student from Windsor or Essex County, in any course and any year.

University of Windsor Women's Auxiliary Bursary:

Value: $100. Awarded annually on the basis of financial need and scholastic ability, to a woman student.

Windsor Club Canadian Federation of University Women Scholarship:

Value $300. Awarded annually for scholastic excellence to a female student in an honours program, who has completed at least one year and is not enjoying a continuing scholarship.

Ronald M. Eisen Memorial Bursary:

Value $100. Awarded annually on the basis of scholastic ability or character or financial need or any combination of the foregoing according to the best judgment of the Committee on Student Awards to a deserving student in any year of any course. Established in 1969 by the employees of Mr. Nathan Tepperman of Windsor, Ontario, in memory of Ronald M. Eisen.

Nathan Tepperman Bursary:

Value: $150. Awarded annually on the basis of scholastic ability or character or financial need or any combination of the foregoing according to the best judgment of the Committee on Student Awards to a deserving student in any year of any course. Established in 1956 by employees of Mr. Nathan Tepperman of Windsor, Ontario.

Carson R. Elford Memorial Bursary:

Value: the annual interest on the Carson R. Elford Memorial fund. Awarded to a student with satisfactory scholastic standing and financial need. Established in 1964 by the family, friends and Ford Motor Company associates of Carson R. Elford.

James Howley Memorial Bursary:

Value: $50. To a deserving student resident at Macdonald Hall, based on academic standing and active participation in residence and university life.

A.T.A. Trucking Industry Educational Foundation Bursaries:

In-course bursaries for students who because of extenuating circumstances are deserving of financial assistance.

Atkinson Charitable Foundation Bursaries:

These awards are made to deserving students who are enrolled in a program leading to a degree, and show evidence of academic sincerity, future promise and financial need. Applicants must be residents of the Province of Ontario.

J. P. Bickell Foundation Bursaries:

A number of bursaries allocated annually to deserving students.

The Birks Family Foundation Bursaries:

A number of bursaries are awarded annually to deserving students with high academic standing.

I.B.M. Canada Thomas J. Watson Memorial Bursaries:

Value $100-$200. These bursaries are awarded annually to students who have completed at least one year of university studies with a B average, and who have financial need. The bursaries are made possible by an annual grant of $1,000 from International Business Machines Co. Ltd.

Proctor and Gamble Bursary Fund:

A number of bursaries, totalling $1,500., will be granted to needy students in any faculty or year who have good academic standing. Recipients must expect to maintain permanent residence in Canada.

Rotary Club of Windsor Bursaries:

Three bursaries of $150 each, awarded on the basis of at least second class honours and evidence of need, to candidates enrolled in any faculty in the University of Windsor, provided that the bursaries are not awarded in the same faculty.

Windsor Independent Insurance Agents Association Bursaries:

A number of awards with values up to $350 each to deserving students who are residents of Essex County.

Institute of World Affairs Award:

The student who represents the University at the Institute of World Affairs Seminar may apply for a waiver of tuition fees for the academic year immediately following the Seminar.

HUMANITIES AND SOCIAL SCIENCES

Rhea Bray Memorial Bursary:

Value: $150. Awarded annually, on the basis of academic merit and need, to a woman student (preferably a freshman) recommended by the Dean of Arts and Science and approved by the Committee on Student Awards. In rare cases may be assigned to the same recipient two years in succession.
Established in 1955 by the Zonta Club of Windsor.

Mary Gooderham Chapter I.O.D.E. Award:

Value $150. To the student who achieves highest standing in First Year English, and who is proceeding to an Honours program in English.

George F. MacDonald Chapter I.O.D.E. Bursaries:

One or more awards of $150 annually. To graduates of Essex County secondary schools who have successfully completed the First or Second Year of the Fine Arts Program.

Alex Pavlini Memorial Award:

Value $200. Awarded to a student in an arts course who has maintained a good scholastic record and who has participated actively in the radio and/or dramatic activities of the University.

Cedar Springs Hospital School Auxiliary Centennial Award in Social Work:

Awarded to an outstanding student enrolled in the honours program in Social Work who shows a particular interest in Children's Institutions and/or Mental Retardation. The minimum value of the award will be $150. with the maximum being dependent on a number of pertinent factors.

Raechel Slobasky Kaplan Social Work Bursary:

Value: $150. Awarded annually to a student enrolled in the School of Social Work.

Allied Chemical Canada Limited Scholarship:

Value $750. To be awarded annually to one student not otherwise holding a scholarship, entering the final year of undergraduate studies in Chemical Engineering or in Honours Chemistry on the basis of academic and extracurricular achievement. Application forms are required and are available in the Awards Office by March 15. Deadline for submission of applications is May 15.

J. P. Bickell Foundation Scholarship:

Total value: $1500. Awarded to the student having the highest academic (but at least A) average entering the second year of a course in Chemical Engineering, Geological Engineering, Engineering Materials or Honours Geology. The sum of $500 is paid to the successful student at the beginning of the second year and further sums of $500 at the beginning of each of the third and fourth years provided he has maintained his A average.

Tonnie Kovinsky Memorial Scholarship:

Value: $250. To an outstanding student in course, registered in Applied Science.

The Reverend E. C. LeBel Award:

Value: $100. An annual award to a student who has completed the third year of any course in the Faculty of Applied Science with a good academic record and who has shown outstanding ability in English and the humanities. Established in 1963 by the Essex County Chapter of the Association of Professional Engineers of the Province of Ontario.

Association of Professional Engineers Undergraduate Scholarships:

$250 awarded by the Ontario Professional Engineers Foundation for Education on the recommendation of the Faculty Council to students in two of the first, second or third years of an accredited engineering program, who obtain the highest standing in the work of their respective year.

Professional Engineers Medal for Academic Achievement:

The Association of Professional Engineers of the Province of Ontario has established in the Faculty of Applied Science an Award in the form of a gold medal together with a gift of technical books valued at $50. awarded to the student of an accredited engineering program who, taking honours, obtains the highest standing in the graduating class.

The Society of Chemical Industry Merit Award:

A gold key and one year subscription to "Chemistry and Industry" awarded annually to the student standing highest in the final year of each of Honours Chemistry, and Chemical Engineering, provided he has an A average, and has completed his program in the normal number of years.

The Chemical Institute of Canada (Essex-Kent Section) Award:

Value: $100. Awarded annually on the basis of high standing in Chemistry and of good standing in the other sciences and in mathematics, to a student entering the second year of any of the honours programs in Chemistry, or Chemical Engineering.

Chemical Institute of Canada Prize:

Silver medal plus $25. Awarded to the student with the highest standing in the penultimate year of Honours Chemistry, Chemistry and Physics, or Chemistry and Biology.

Canadian Society for Chemical Engineering Prize:

Silver medal plus $25. Awarded to the highest student completing the penultimate year of Chemical Engineering.

The Odette Bursary in Engineering:

Value: $200. Awarded annually at the discretion of the Committee on Student Awards to a deserving student in Engineering. Established in 1955 in memory of L. L. Odette, Sr., of Tilbury, Ontario by his sons L. L. Odette and E. G. Odette.

Student Engineering Society Award:

Value: $100. Awarded annually on the basis of participation in Engineering Society activities, personal qualities, character, and social and athletic activities, to a student entering fourth year Engineering.

Engineering Institute of Canada Student Prize:

A prize of $100, awarded to a student member of the Institute in the year prior to the graduating year on the basis of the marks made in his academic year, and his activities in the student engineering organization or in the local branch of a recognized engineering society.

Alex Fraser Goldberg Memorial Award in Nursing:

Value: $200. To an outstanding student registered in a degree program in Nursing. Established by friends of Mr. Goldberg.

BUSINESS ADMINISTRATION

H. A. Scarff Memorial Prize:

A prize of $50. Awarded annually to the student with the highest standing in Business Administration 115. Established in 1957 by friends of the late Mr. H. A. Scarff, former member of the Senate.

Riddell, Stead & Company Award:

Value: $500 to be applied against university fees in the fourth year. Awarded to a student who has completed the third year of the Honours Bachelor of Commerce program with high standing who is proceeding to the fourth year, and who intends upon graduation to continue studying with a practising firm of Chartered Accountants. The award is made on the recommendation of the Dean of the Faculty of Business Administration.

Milton M. Kovinsky Memorial Scholarship:

Value: $250. To an outstanding student in course, registered in Business Administration.

Price Waterhouse and Co. Scholarship:

Value: $250. Awarded annually to a student who has completed the third year of the Business Administration program who has an outstanding academic record and ability, and whose interest is in public accounting as a career.

Clarkson, Gordon and Co. Scholarship:

Value: $200. Awarded annually to a student interested in a public accounting career who has completed the third year of the honours program in Business Administration, with a good overall average.

The William G. Danby Memorial Bursary:

Award of $100. to an outstanding Canadian student who is a permanent resident of Essex County; who is enrolled in the third year of the Honours Business Administration program, who shows a high aptitude for personnel administration and labour relations work. Presented by the Personnel Association of Windsor and District, Incorporated.

Ben Matthews Prize in Business Administration:

Value: $200. Awarded annually to the outstanding student in the graduating class in Honours Business Adminstration.

Cambridge Leaseholds Scholarship in Marketing:

Value: $250. Awarded annually to a student who has completed the third year of the Business Administration program and has an outstanding academic record and is interested in marketing as a career.

FACULTY OF LAW

Essex Law Association Prize:

Value: $150. To the student with the highest standing in First Year Law.

McTague Prize:

Value: $250. Divided among the students with the highest standing in Second Year Law.

Robert H. Wilson Prize:

Value: $250. Divided among the students with the highest standing in Third Year Law.

Thomson, Rodgers Prize:

Value: $150. To the second year student with the highest standing in Company and Commercial Law.

Thomson, Rodgers Prize in Corporate Finance:

Value: $150. To the third year student with the highest standing in Corporate Finance.

Canada Law Book Company Prizes:

Three book prizes of $50. awarded annually at the discretion of the Dean of the Faculty.

Carswell Book Prizes:

Three book prizes of $50. awarded annually at the discretion of the Dean of the Faculty.

C. C. H. Canadian Ltd. Book Prize:

A book prize awarded annually to the student with the highest standing in the Legal Writing program.

Phi Alpha Delta Book Prize:

A $25. book prize awarded annually to the student with the highest standing in the first term of the first year.

Alex Fraser Goldberg Memorial Award in Law:

Value: $200. To a deserving married student in the Faculty of Law. Established by Windsor Lodge 1011, B'nai B'rith.

PHYSICAL AND HEALTH EDUCATION

Fruehauf Trailer Company of Canada Bursaries:

To deserving students in the Faculty of Physical and Health Education. Made available by an annual $300 grant from the Fruehauf Trailer Company of Canada.

Mary O'Brien Memorial Scholarship:

Value: $250. Available annually to a student who is recognized by the Faculty Council as being an outstanding scholar and athlete. The student must have successfully completed two years of the undergraduate program and be enrolled in the kinesiology stream within the Faculty of Physical and Health Education.

DIVISION OF EXTENSION

Industrial Management Clubs of Canada Awards:

Value: the earnings of an investment of $2000. will be made available for one or more awards each year. The awards will be given to deserving students enrolled in credit courses in the **Division of Extension.** Applicants must be Canadian residents, full time employees in business, industry, government or one of the professions, and must not be a recipient of "tuition refund" aid. Application forms available in the Extension Office, Room 110, Windsor Hall.

B. OUTSIDE AWARDS

The following awards are not administered by the University of Windsor, but students of the University may apply for those for which they are eligible.

Ontario Scholarship Program:

The Province of Ontario awards Ontario Scholarships to all students who achieve an average of 80 per cent or better in subjects as required for the Ontario Secondary School Honour Graduation Diploma. These students are designated "Ontario Scholars" and receive an award of $150. No application is required.

Ontario Student Awards Program:

All students who are residents of Ontario and who satisfy the admission requirements of a Canadian university or an eligible post-secondary institution in Ontario may apply for an award under this Program. To receive an award a student must establish a need for assistance and enrol in an eligible institution in a course other than Divinity in the year of award.

An award under this program will be made to the extent of established need in a combination of a non-repayable grant and a Canada Student Loan. Application forms are available at all eligible post-secondary institutions.

Canterbury College Awards

The following four awards are administered by Canterbury College. Application for them should be made to the Principal of the College by June 1st.

(1) **Fred Musson Memorial Bursary:**

Value $100. To be awarded to an undergraduate or graduate student on the basis of ability and need.

(2) **Brotherhood of Anglican Churchman Prize:**

Value $100. To be awarded to the student in the Anglican section of First Year Theology obtaining the highest mark.

(3) **Guild Prize I:**

Value $50. To be awarded to the student in Canterbury College obtaining the highest overall average, in any course or year.

(4) **Guild Prize II:**

Value $50. To be awarded to the best all-round student in Canterbury College. The students shall nominate three; the winner to be chosen by the Principal of Canterbury College.

University of Windsor Alumni Association Student Activity Awards:

Several Alumni Awards to be assigned on the basis of contribution to co-curricular activities such as art, student government, clubs and activities, publications, writing, and athletics. Application forms are available at the Alumni Office.

Ellen Sullivan Memorial Bursary:

For graduates of Notre Dame High School, Chattanooga, Tennessee. The value of the bursary is the annual interest on Sullivan Bursary Fund (approx. $1,000) held in trust by Assumption University. Apply to The Principal, Notre Dame High School, Chattanooga, Tennessee.

North American Benefits Association Windsor Club 610 Bursaries:

Four awards annually to female undergraduates at the University of Windsor who are graduates of Windsor and Essex County secondary schools. Further information is available in the Awards Office.

Domforge Windsor Credit Union Bursaries:

Three awards annually, each valued at $150. Allocated to children of Credit Union members, or members in their own right, who are entering second year or beyond and have a minimum of 65 per cent in their qualifying year. Application forms are available in the Awards Office.

Dr. W. P. Percival Memorial Award:

Awarded annually to a student preferably in Medical Science or Archaeology, at the University of Windsor, on the basis of satisfactory standing and financial need. In memory of the late Director of Protestant Education in the Province of Quebec. Donated and presented personally by Dr. W. L. Percival.

I.O.D.E. Windsor & Essex County Municipal Chapter Centennial Award:

Value: $150. Available to students of Windsor and Essex County enrolled in any year beyond the First at the University of Windsor. No application is required.

Other qualifications being equal, preference will be given to students whose interests lie in the field of Commonwealth Relations, or Canadian History.

For further information apply to the Awards Office of the University.

The Champion Spark Plug Co. of Canada Ltd., Scholarships:

Two $500 scholarships, annually, renewable for three additional years or until graduation, whichever is sooner, on condition that the student achieves satisfactory standing, normally Second Class Honours, as well as maintaining the initial standards of qualification. Applicants must be enrolling in acceptable full-time programs at accredited colleges or universities and must be sons or daughters of active or pensioned employees of Champion Spark Plug Co. of Canada Ltd. Application forms may be acquired from the office of Champion Spark Plug of Canada Ltd., Windsor 14, Ontario.

Royal Arcanum of Windsor Coronation Council #2224 Bursaries:

A number of bursaries totalling $1,000. to be allocated to full-time students at the University of Windsor who are graduates of Windsor and Essex County high schools on the basis of academic standing (minimum of C average standing and financial need). Further information available in the Awards Office.

Chrysler Canada Scholarships:

Value: Amount based on academic achievement and determined annually by a board of Awards. For children of active, retired, or deceased employees of the Company, and Chrysler dealerships. Apply to Salaried Personnel Department, Chrysler Canada Ltd., Windsor, Ontario.

Hiram Walker & Sons Scholarship:

Value: $850 a year for sons or daughters of employees. Apply to Public Relations Department, Hiram Walker & Sons Ltd., Walkerville.

Imperial Oil Higher Education Awards:

Compulsory fees for children or wards of employees or annuitants of Imperial Oil Limited or its subsidiaries. Apply to Secretary, Committee on Higher Education, Imperial Oil Limited, 111 St. Clair Ave., W., Toronto 7, Ontario.

International Nickel Company Participating Scholarships:

The International Nickel Company of Canada, Limited provides fifty awards annually at Canadian universities to students who will enter the penultimate year of a baccalaureate program in science or engineering. Interested students should request application forms from the Awards Office at the University or write to the Administrator of Educational Affairs, The International Nickel Company of Canada, Limited, P.O. Box 44, Toronto-Dominion Centre, Toronto 111, Ontario.

G. Caboto Club Scholarships:

Aggregate value: $600. Two or more scholarships to Grade 13 students of Italian descent, residents of the County of Essex community, who are proceeding to a University.

Application forms may be obtained in the Windsor Secondary Schools.

V.O.N. Bursaries:

Value: $1,800. For nursing students only. Application to be made to the Victorian Order of Nurses, 5 Blackburn Avenue, Ottawa, Ontario.

Masonic Foundation of Ontario Bursaries:

A bursary fund provides money for a limited number of awards to students experiencing financial problems of an emergency nature. These are assigned without respect to race or creed, to residents of Ontario who are Canadian citizens or landed immigrants. For further information communicate with the Awards Office at the University.

Essex County Pharmacists' Association Bursary:

Value: $200. Apply to the Secretary of the Association.

Navy League of Canada Bursaries:

Value: $300. Apply to the Commanding Officers of Sea Cadet Corps.

Essex County Medical Society Bursary:

Value: $750. To a resident of Essex County who has completed the pre-medical course at a Canadian university and who has been accepted in Medicine at a Canadian University. Applicants must have a B average in the final pre-medical year and must have some financial need. Apply to: The Scholarship Award Committee, Essex County Medical Society, 1474 Ouellette Ave., Windsor, Ont.

St. John Ambulance Association of Canada Bursaries:

One or more bursaries of $1,000 from the Margaret MacLaren Memorial Fund will be awarded annually to experienced Registered Nurses for study at the Master's level. This fund may also be used to serve the needs of student nurse applicants with preference given to those with St. John Ambulance affiliation. Applications must reach the following address by May 1: Chairman of Bursary Funds, 321 Chapel St., Ottawa.

St. John Ambulance Association of Canada Bursaries:

Countess Mountbatten Bursaries of from **$200 to $400.** to student nurses in the basic and graduate programs. Awards are made according to academic qualifications, personal suitability and financial need. All factors being equal, special consideration will be given to those with St. John affiliation. Applications are to be forwarded not later than May 16, to the Chairman of Bursary Funds, St. John Ambulance National Headquarters, 321 Chapel Street, Ottawa 2, Ontario.

Ontario Department of Health Bursaries for Public Health Nursing:

Bursary assistance is available through Local Health Services Branch of the Ontario Department of Health, for study at diploma, certificate or degree level for preparation in public health nursing.

This assistance consists of monthly stipends during the course of studies as well as coverage of university fees. Acceptance carries a service commitment to public health nursing in a local official health agency in Ontario.

For further information contact: Senior Consultant, Public Health Nursing, Local Health Services Branch, Room SW 926, Hepburn Block, Queen's Park, Toronto, Ontario.

Windsor Utilities Commission Bursaries:

Two bursaries valued at $300. each. One bursary awarded to any student whose home is serviced by Windsor Utilities; the other awarded to a son or daughter of a Windsor Utilities employee. Written applications are to be forwarded to the Secretary-Treasurer of the Windsor Utilities Commission, 787 Ouellette Avenue, Windsor, Ontario by June 30th.

I.O.D.E. Windsor & Essex County Municipal Chapter Bursaries:

Two awards of $400 and $300 are given to students in post secondary education who are graduates of Windsor and Essex County Secondary Schools.

Apply to the Educational Secretary of the Windsor & Essex County Municipal Chapter I.O.D.E.

I.O.D.E. Chapter Bursaries:

A number of Primary I.O.D.E. Chapters offer bursaries to students who are graduates of local secondary schools.

For further information apply to the Educational Secretary of Windsor & Essex County Municipal Chapter I.O.D.E.

Lucy Morrison Memorial Fund - Provincial I.O.D.E.:

This fund provides money for awards to Canadian students who are experiencing financial problems of an emergency nature. Applications for assistance should be directed to: Provincial Education Secretary, 168 Jackson St. West, Hamilton, Ontario.

The Royal Canadian Legion and Ladies' Auxiliary Bursaries:

Available to persons eligible for membership in The Royal Canadian Legion or to children of deceased Veterans or to children of parents either of whom is eligible for membership in The Royal Canadian Legion.

The Donors are: (a) Dominion Command, (b) Ontario Provincial Command & Ladies' Auxiliary, (c) Legion Branches.

Enquiries regarding these bursaries may be directed to the local Zone Commander or to the principals of the secondary schools.

Windsor and District Labour Council Centennial Award:

Value: $150. One or more awards to be granted annually on the basis of scholarship, financial need and on interest displayed in social and economic problems and in extra curricular activities of a literary or organizational nature in secondary school or university. The student must be a son or daughter of a member of a Council affiliate who is a resident of Essex County and must be a Grade 13 graduate of an Essex County secondary school.

Application forms may be obtained from the Awards Office before July 31st.

Royal Canadian Engineers Memorial Scholarships:

Scholarships of up to $500. each are offered annually to male or female students who are attending any acceptable course in a post-secondary institution. Applicants must be children or grandchildren of a person in the various engineering branches of the Canadian Armed Forces. Further details and applications are available from the Awards Office, University of Windsor.

St. Elizabeth Visiting Nurses Association Bursaries:

Bursary assistance is available through the Association to students in their final year of study of Public Health Nursing, in the amount of $1,500. There is a working commitment of one year, following successful completion of their course.

German-Canadian Club Teutonia Entrance Award in German:

To a student obtaining the highest standing in Grade 13 German in the Windsor secondary schools. Value: $200.00. Apply through Windsor's secondary schools, or to the Teutonia Club, 55 Edinborough, Windsor 12, Ont.

Canadian-German Academic Exchange Association:

The Professor Hermann Boeschenstein Prize and the Dr. Wenzel Jaksch Prize, consisting of free return transportation to and from Germany, honoring the two co-founders of the Association's **Deutschlandprogramm**. Available to needy students wishing to study in Germany for a summer under the auspices of the Association. For details apply to the Department of Germanic and Slavic Studies, University of Windsor.

Further information on many of the awards listed above is available in the Awards Office.

C. LOANS AND OTHER FORMS OF AID

University of Windsor Emergency Loans:

The University operates an Emergency Loan Fund which is meant to support students through temporary periods of financial difficulty. Amounts up to $200 are available for periods of up to two months duration if satisfactory arrangements for repayment can be made.

A student is limited to two loans or a total of $200 per academic year and must have a minimum of "C" average standing in the previous academic year. Further information is available in the Awards Office.

Rotary Club of Windsor Student Loan Fund:

Interest free loans to graduates of Windsor Secondary Schools. Preference given to students nearing graduation.

Apply to Youth Services Committee, Rotary Club of Windsor.

The Harry F. Bennett Education Fund of the Engineering Institute of Canada:

Loans are available from this Fund to enable deserving students who have completed at least one year in engineering to complete their studies. Maximum amount for one year: $250; maximum for all years: $450. The loan is without interest until graduation; thereafter interest at 4% per annum is charged on the unpaid portion.

For details apply to Dr. Cameron MacInnis, E.I.C. faculty representative on campus.

Canada Student Loans Plan:

Full details of this Plan are available in a brochure issued by the Government of Canada which may be obtained at all eligible post-secondary institutions and secondary schools in Ontario. Students not eligible under the Ontario Student Awards Program may apply for a Canada Student Loan provided they are attending an institution in Canada or abroad which has been designated as eligible for Canada Student Loans only. The application form for the Ontario Student Awards Program is also used for the Canada Student Loans Plan.

Canadian Forces Medical Undergraduate Subsidization Plan:

This scheme is designed to assist those who wish to make a medical career in one of the Armed Forces. Free academic tuition during the last three years of training in a medical school and other benefits are provided. Although previous training in the services is not an absolute necessity, the application by those who have had training in the UNTD, COTC, or URTP will naturally be more favourably received than those who have not had any military experience. Further information may be obtained from Armed Forces representatives on campus.

The Children of War Dead (Education Assistance) Act:

Passed on July 1, 1953, this Act provides assistance towards an education beyond secondary level for sons and daughters of veterans whose deaths were attributable to service in World War I, World War II, the Korean operations or peace-time service. If the application is approved, the Department of Veterans Affairs will pay

(a) to the student, an allowance of $34 per month for the period during which he or she is pursuing a full time course, up to a maximum of 36 months, or four academic years;

(b) to the university, fees and other costs of tuition as described in the Act, up to a maximum of $800 per academic year.

For further details consult the local office of the DVA.

Department of National Defence:

Students may apply for training in Canada's Armed Forces (Reserve). Interested candidates are advised to enquire at the local Recruiting Centre about the available programs. The University will cooperate in those established by the Department of National Defence.

State Assistance for U.S. Students:

Several of the States operate student assistance programs which include the University of Windsor as an approved institution. These awards are based usually upon residence and financial need. Prospective students are advised to apply to the appropriate State Education Authority. Two such plans are outlined below:

Michigan Higher Education Assistance Authority:

Students resident in Michigan attending the university may apply for financial assistance through the M.H.E.A. Enquiry about the plan should be made through your bank or directly to Michigan Higher Education Assistance Authority, 906 Prudden Building, Lansing, Michigan.

New York Higher Education Assistance Corporation:

Students, resident of New York State, attending this University may apply for financial assistance through the N.Y.H.E.A.C. Loan applications may be requested through New York lending institutions, or by writing to N.Y.H.E.A.C., 159 Delaware Avenue, Delmar, New York 12054.

Student Aid Foundation of Michigan:

Students living in Metropolitan Detroit may recieve grants and loans for use at this University on the basis of academic record, character and financial need. Applicants should contact the Student Aid Foundation of Michigan, 2486 National Bank Building, Detroit 26, prior to December 14.

U.S. Veterans' Affairs Aid Program:

Under an agreement between the University and the Veterans' Administration, financial aid is available to servicemen or veterans of the United States Armed Forces. Enquiries should be addressed to the local representative of the Veterans' Administration nearest to the student's place of residence.

PART D

ACADEMIC INFORMATION (UNDERGRADUATE)

PART D

ACADEMIC INFORMATION (UNDERGRADUATE)

ACADEMIC INFORMATION

I. FACULTIES, DEGREES, AND DIPLOMAS

The academic work of the University is divided among seven Faculties, (each under the supervision of a Dean), and the autonomous School of Computer Science. The Schools of Dramatic Art, Nursing, and Social Work are included in the Faculty of Arts and Science. The Faculties, programs, and degrees are as follows:

(a) Faculty of Arts and Science:

Bachelor of Arts (B.A.)
- General program in Arts leading to the B.A. degree.
- Honours programs in Arts leading to the B.A. degree.

Bachelor of Fine Arts (B.F.A.)
- Honours program leading to the B.F.A. degree in Fine Arts.

Bachelor of Music (B.Mus.)
- Honours programs leading to the B.Mus. degree in History and Theory, or in School Music.

Bachelor of Science (B.Sc.)
- General program in Science leading to the B.Sc. degree.
- Honours programs in Science leading to the B.Sc. degree.

School of Dramatic Art
- Honours program leading to the B.F.A. degree in Dramatic Art.

School of Nursing
- Honours programs leading to the Bachelor of Science in Nursing Degree (B.Sc.N.)
- Diploma program in Public Health Nursing.

School of Social Work
- Honours program leading to the B.S.W. degree.

Certificate in Public Administration (by Extension only).

Certificate in Theology (by Extension only).

(b) School of Computer Science:

General and Honours programs in Computer Science leading to the B.C.S. degree.

(c) Faculty of Applied Science:

Bachelor of Applied Science (B.A.Sc.)
- Honours programs in Chemical, Civil, Electrical, Geological, Industrial and Mechanical Engineering, and Engineering Materials, leading to the B.A.Sc. degree.

(d) Faculty of Business Administration:

Bachelor of Commerce (B.Comm.)
- Honours program in Business Administration leading to the B.Comm. degree.

Certificate in Business Administration (by Extension only).

(e) Faculty of Education:

Bachelor of Education (B.Ed.)

Diploma in Elementary Teacher Education.
- Program for elementary school teachers leading to certification by the Department of Education.

(f) Faculty of Physical and Health Education:
Bachelor of Physical and Health Education (B.P.H.E.)
Honours program leading to the B.P.H.E. Degree.

(g) Faculty of Law:
Bachelor of Laws degree (LL.B.).

(h) Faculty of Graduate Studies:
Master of Arts (M.A.);
Master of Science (M.Sc.);
Master of Applied Science (M.A.Sc.);
Master of Business Administration (M.B.A.);
Master of Physical Education (M.P.E.);
Master of Social Work (M.S.W.);
Doctor's Degree (Ph.D.).

In the face of the twentieth-century explosion of knowledge, it has become increasingly important for students to extend their knowledge beyond the Bachelor's degree. Indeed undergraduate education is now regarded by many students as the mere stepping-stone to the full development of their scholarly and professional capacities.

All graduate-level courses are offered through the Faculty of Graduate Studies. At present, programs leading to the Master's degree are offered in: business administration, creative writing, economics, English, French language and literature, geography, history, philosophy, political science, psychology, romance languages, sociology, theology, biology, chemistry, mathematics, physics, physical education, social work; in chemical, civil, electrical and mechanical engineering, and engineering materials. Doctoral programs are offered in: psychology, mathematics, biology, chemistry, physics; and in chemical, civil, electrical and mechanical engineering, and in engineering materials.

In addition to the above seven Faculties, there is the Faculty of Theology in Holy Redeemer College of Assumption University.

II. ATTENDANCE AND LENGTH OF COURSE

1. Regular Winter Session

Regular courses are offered in the winter session extending from September to May. In general, most courses are continuous throughout the year, but some half-year courses are also offered. Final examinations for half-year subjects of the first semester are written in December.

2. Other Sessions

Courses are offered through the Extension Division in evening classes during the Winter Session, and during the Intersession (late Spring) and Summer School. Courses given in these sessions carry the same credit as those in regular Winter Session; calendars are available on request.

3. Intramural Attendance and Length of Course

The number of years of attendance required for the attainment of any degree is as indicated in each program. This time may be reduced through the transfer of credit from another university. In each case attendance at intramural classes for at least one full academic year or the equivalent (three intersessions, summer sessions or winter sessions part time, or a combination of these) shall be required.

In the case of programs leading to undergraduate degrees, a candidate may be excused attendance for not more than one full academic year or the equivalent through the transfer of credit obtained by correspondence courses through another university.

A student may take courses for credit in Intersessions or Summer Schools conducted by this or other institutions. Such courses, if approved, may be counted towards degrees. Day students enrolled at the University of Windsor must be sure that their course selections are appropriate, and that they are eligible, if they wish to register at Intersession or Summer Session at the University of Windsor.

III. APPLICATION

A student who is attending a High School in Ontario should obtain application forms from his Principal or Guidance Officer. When the Ontario Secondary School student is notified by the University that he has been accepted, he will be required to send a deposit of $25 (non-refundable) on his tuition.
All other persons may obtain application forms by writing to:

The Admissions Office
The University of Windsor
Windsor 11, Ontario, Canada.

A $25.00 tuition deposit must be submitted with the application. The deposit will be refunded if the applicant cancels in writing before August 1 or if the application is not accepted. No refund will be allowed for applications which are incomplete after September 1. The deposit is not transferable and may be applied only to the applicant's tuition of the year for which admission is sought in his application.

All students are encouraged to apply as early as possible. No assurance is given that an application received after September 1 will be given consideration.

A student from outside continental North America must have his application complete and in the Admissions Office before July 1.

All applications **must** be complete by the last date of registration.

A student whose application is not complete by the regular registration period may be allowed to register provisionally (that is, allowed to attend classes while his application is still under consideration). If the file is not complete by the last day of registration, or if the student is not eligible for admission as a credit student, he will be allowed to continue on a non-credit basis only, as an **audit** student. (See p. D-10).

Former students of this University who have not been registered here during the preceding calendar year are required to apply for readmission through the Admissions Office before registering.

A student who wishes to apply for the second semester only, on a part-time basis, must have his application complete by December 15.

Transfer Student

An applicant who wishes to transfer (at any level) from another college or university must arrange for a complete transcript of his record and a statement of honourable dismissal to be sent to the Registrar directly by each institution previously attended.

Every student will be required to complete at least one full year or the equivalent at this University, including at least two courses in his major field, before qualifying for a degree.

Transient Student

A student who wishes to take a course for credit at this University, with the intention of transferring the credit to the university at which he was previously registered, must have the **written** permission of the Registrar of his home university in order to take the course. A transient student may, if he wishes, register in courses on proof of good standing at his home university (transcript or current grade report) provided that he does not expect to receive degree credit for the courses.

IV. ADMISSION

General Requirements For Admission

Admission requirements to any part of the University are based on the student's achievement and ability. All applicants will be considered on the basis of total evidence presented: academic records, principal's recommendation, aptitude tests, etc. In special circumstances an applicant may be asked to come to the campus for tests and interviews.

S.A.C.U. test scores will be part of the general requirements for admission to this University. If S.A.C.U. scores are not available, C.E.E.B. scores or equivalent will be accepted.

Advanced placement may be granted to superior applicants, for high school subjects taken above the normal high school graduation level.

Specific requirements for admission to the various faculties and programs are given with the description of these programs.

A student who satisfies the general admission requirements, but who lacks a specified subject required for admission to a particular program, will be considered for admission to the University, and, if admitted, may be required to do additional work or to take courses to remove the deficiency before being admitted to the subject for which it is a prerequisite.

Each applicant FROM ABROAD whose native language is not English is required to take an English Proficiency Test administered by either the English Language Institute of the University of Michigan, or "Test of English as a Foreign Language" (T.O.E.F.L.) as part of his requirements for application. If, after passing the test, the student still has difficulty with the language, he may be asked to do remedial work.

A. REGULAR ADMISSION

The following are the requirements for regular admission. (Students lacking regular requirements will be considered under special conditions; see "Special Admission", p. D-9).

1. To Preliminary Year

The University offers a Preliminary Year which consists of a full year of study equivalent to Grade 13 of the Ontario High Schools or to First Year of those universities which have a four-year General course. (For the program of courses and academic regulations, see "Preliminary Year", p. E-22).

(a) From Ontario Grade 12:

The general requirement for admission to the Preliminary Year is completion in not more than four years beyond Grade 8 of twenty-seven academic credits in a program oriented toward university studies (four complete years of Secondary School work through Grade 12); at least seven of the credits must be at the Grade 12 level; an average of 66% or more is required. The student must also receive a favourable recommendation from the Secondary School Principal.

It is strongly recommended that subjects taken include:

English
Another language
Mathematics (Grades 11 and 12)
History or Geography
Science (Grades 11 and 12)
One other acceptable option for the Graduation Diploma.

Applicants for the Science, Nursing and Applied Science programs must have completed Mathematics (Grades 11 and 12), Physics and Chemistry (or Agriculture). Applicants for the Commerce program and those who intend to major in Mathematics must have completed courses in Mathematics (Grades 11 and 12). A student who intends to take a major or honours program in a specific language should have that language to the Grade 12 level.

(b) **From Outside Ontario:**

An applicant who has completed High School work **in Canada outside of Ontario** should submit the Departmental or other official certificates (originals) to the Committee on Admissions for a decision regarding eligibility for entrance.

Graduation from a **United States High School** will admit to the Preliminary Year provided the applicant has completed at least 16 academic units (8 of which should be B grade or recommending grade), including 4 units in English, and sequences (at least 2 and preferably 3 units) in each of Mathematics, Science, Social Studies and one foreign language. In addition the applicant should have at least four academic subjects in Grade 12 with at least a B or recommending grade in three of them.

He must receive a favourable recommendation from his High School Principal, must obtain a score satisfactory to the Committee on Admissions on his aptitude tests, and should rank in the upper half of the class.

Highly qualified applicants from the United States will be given final acceptance after the first term marks of the final year of High School have been received, if the applicant meets the admission requirements at that time, provided that the graduation certificate is presented.

The General Certificate of Education of **Great Britain** (or an equivalent certificate from elsewhere in the Commonwealth) will admit to Preliminary Year provided it indicates satisfactory completion of five subjects at the Ordinary Level; English, Mathematics, another language, Science and Social Science will normally be required.

An applicant from **Latin America** must present a certificate showing satisfactory completion of the bachillerato necessary for admission to university in the applicant's own country.

2. **To First Year**

Admission to First Year of the University is obtained in one of the following ways:

(a) **From Ontario Grade 13:**

The general admission requirement is an average of 60% (or equivalent) on a full Grade 13 level program as approved by the Secondary School; and submission of satisfactory test results as scored by the Service for Admission to College and University.

It is strongly recommended that a student's Secondary School program at the Grade 11 and 12 levels include English (or Français), another language, Mathematics, Physics, Chemistry, and Geography or History.

The subjects required for admission to a particular program are shown with the specific admission requirements for each Faculty.

Early Admission

Admission of qualified students who have applied early will be decided in Spring on the basis of the total Secondary School performance, Grade 13 term and interim marks, and Principal's recommendations. In the case of students who have doubtful or borderline qualifications, decision on admission will be deferred until the Grade 13 final results are available. In any case, the student is expected to complete a full Grade 13 level program.

(b) **From Preliminary Year**

The satisfactory completion of the Preliminary Year prepares a student for admission to First Year of all undergraduate programs, provided the proper subjects are chosen and the appropriate average obtained.

(c) **From Outside Ontario**

An applicant who has completed High School work outside of Ontario should submit the Departmental or other official certificates (originals) to the Committee on Admissions for a decision regarding eligibility for entrance.

The General Certificate of Education of **Great Britain** (or an equivalent certificate from elsewhere in the Commonwealth) will admit to the First Year provided it indicates satisfactory completion of five subjects, with two at the Advanced Level appropriate to the course chosen, or four subjects with three at the Advanced Level appropriate to the course chosen. Applicants for the Bachelor of Science and Bachelor of Applied Science programs must have completed Chemistry, Physics and Mathematics at the Advanced Level.

B. SPECIAL ADMISSION

1. Probation

A student lacking the full admission requirements or a transfer student may be placed **on probation** by the Committee on Admissions. Students who show unsatisfactory progress may be placed on probation by the Committee on Academic Standing of their

Faculty. Probation is removed when the student passes his probationary period. The conditions for passing are the same as those for regular students. Should the student fail his year, he normally will not be allowed to repeat, but may be required to withdraw from the Faculty. For regulations pertaining to the possible readmission of students who have been required to withdraw, see regulations pertaining to each Faculty.

In the case of a student who is on probation in part-time, extension or summer session studies, the student's progress report will be referred to his Academic Standing Committee after the completion of two courses; if the student's progress is not satisfactory, he may be required to withdraw at that time.

2. **Trial**

A student may be accepted into a particular course program on trial; if such student shows unsatisfactory progress or fails his year, he will not be permitted to repeat the same course program.

3. **Adult Student**

A student who lacks the regular admission requirements, and who is twenty-one years of age by December 31 of the year of application, and who has been out of full time formal Secondary School studies for three years or out of Grade 13 for two years, may be admitted to the University on probation; prerequisites for a specific program are to be made up by additional courses or private study. The student's birth certificate must be submitted with his application. (For details concerning "Probation", see above). (Nursing students, see "School of Nursing".) Applicants from overseas are not eligible for consideration under the "Adult Student" clause.

4. **Audit Student**

An audit student in any course is one who attends that course without credit towards a degree or program, and who is not entered or registered on the official University records or lists, for purposes of academic or degree credit or transcript. Such a student will not be allowed to write examinations and cannot be graded in any way. He will normally pay the regular fees for the course(s) or program.

5. **Transfer Student**

A student may transfer from another college or university, but will be required to complete at least one full year or the equivalent at this University, including at least two courses in his major field, before qualifying for a degree. For details of applications, see p. B-6.

Applicants wishing to transfer into specialized programs are evaluated on an individual basis.

Students who achieve high standing in the three year program of the Ryerson Polytechnical Institute or a College of Applied Arts and Technology may be considered for admission to an appropriate

second year university program. Students who achieve high standing in two years of non-university post-secondary education may be considered for admission to an appropriate first year program.

6. **Transient Student**

A student may take courses for credit at this University, for the purpose of transferring the credit to the university at which he was previously registered. He must have the **written** permission of the Registrar of his home university in order to take the course. A transient student may, if he wishes, register in courses on proof of good standing at his home university (transcript or current grade report) provided that he does not expect to receive degree credit for the courses.

V. REGISTRATION

1. **Counselling**

A course consultant will be provided who will render the student every assistance in planning his program. **Nevertheless, the responsibility for familiarizing himself with the requirements for degrees and with academic regulations rests primarily with the student himself.** At registration, no student may take an **additional course,** or make any other exception to the approved program as outlined in the calendar without **written permission from his Dean.**

2. **Time and Place of Registration**

Each student must register at the beginning of each session at the time and place designated by the Registrar. Although the courses selected may be offered in different Faculties of the University, all students register through the Registrar's Office.

Students who fail to register at the time and place fixed by the Registrar will be required to pay a late registration fee (see p. C-11).

Registration will not be considered complete or official unless satisfactory fee arrangements have been concluded by the last day of late registration.

Unless there are exceptional reasons known in advance, no student will be permitted to register later than three weeks after the beginning of classes.

3. **Provisional Registration**

A student whose application is not complete by the regular registration period may be allowed to register provisionally. All required forms and documents must be submitted before the last day of registration. If the file is not complete by that date, or if the student is not eligible for admission as a credit student, he will be allowed to continue on a non-credit basis only, as an audit student (see above).

4. **Change of Registration**

Once a student has registered, he may not **change his course, or add or drop subjects** without **permission from his Dean,** or, in the

case of students in the Extension Division, without permission of the Dean of Extension.

If any change in fees, or refunds, are involved the student will also see the Cashier's Office. (See "Fees" p. C-10).

Any subject dropped without the permission of the Dean will be regarded as a failure.

Students who find it necessary to withdraw from the University or from a course must notify the Dean's office in writing, giving the reason for the withdrawal.

5. **Classification of Students**

A full-time student is one who is registered in four or more full undergraduate courses.

A regular student is one who has satisfied all the admission requirements and is pursuing the course program as outlined in the calendar.

A conditioned student is a student who, in any year, does not have standing in a required subject or subjects of a preceding year.

A special student is a student taking courses for credit but not proceeding to a degree at this University.

A probationary student is one who has been placed on probation at the time of his admission, or one who, subsequent to his admission, has shown unsatisfactory progress and has been placed on probation by the Committee on Academic Standing of his Faculty. (For particulars, see Probation", p. D-9).

6. **General Regulations**

No student who is employed full-time will be permitted to attempt more than three full courses in the winter session, nor more than one full course in the intersession or summer session.

Every student entering the University in Preliminary or First Year is required to complete satisfactorily a course in Library Orientation, except those who have completed similar work at Teachers' College.

Any student of any year who shows an unsatisfactory knowledge of spoken or written English must do additional assignments until his work satisfies his instructors.

VI. EXAMINATIONS

The following regulations apply to students in all faculties. For specific regulations regarding supplemental examinations for each Faculty, see the academic regulations pertaining to the respective Faculty.

For courses offered in one Faculty, exclusively for students of another, the regulations of the Faculty in which the student is

registered will apply. For courses taken by students of one Faculty in another, the regulations of the Faculty in which the course is offered will apply. In the event that special consideration is required for individual students in one Faculty concerning courses being taken in another, the Dean of the Faculty in which the student is registered shall make recommendations to the Dean of the Faculty in which the course is offered.

1. Regular Examinations and Term Work

The regular examinations will be held in December and April. If a student writes more than one examination in a course, the last mark he obtains shall be the only one considered for academic credit.

Term work in a course will not be credited to a student beyond the year in which the course is taken.

2. Supplemental and Special Examinations

For regulations governing supplemental and special examinations, see the "Academic Regulations" of the Faculty or School concerned.

3. Conduct of Students During Examinations

A candidate writing an examination will write on the paper provided for him; he may not talk to another candidate; he may not copy from another nor allow another to copy from him; he may not bring into the examination room any printed or written material (except such aids as may be specifically permitted for a candidate writing a particular subject).

Any violation of these rules will be regarded as a serious offence, and may lead to the cancellation of the paper(s) of the offending student and even to his expulsion from the University.

4. Failures

For information regarding failures, withdrawal and re-admission see specific regulations pertaining to each Faculty.

5. Appeals

(i) **Aegrotat Standing:** A student who wishes to receive consideration on account of serious illness or bereavement or other grave reason prior to or during the examination should communicate with the Registrar's Office before the close of the examination period and should submit supporting documents (e.g., a medical certificate) within one week of the date of the scheduled examination.

(ii) **Other Appeals:** While all papers in failed subjects are re-read before the grades are submitted to the Registrar's Office, and every care is taken to record marks accurately, any student who considers that some factor affecting the final mark on the

examination was not considered by the examiner, may appeal to have the subject reviewed. This request must be submitted in writing to the Registrar's Office, together with a fee of $10.00, no later than two weeks after the final mark has been released by the Registrar. In the event that the grade is changed to the student's benefit as a result of the appeal, the fee will be refunded.

Any appeal for special consideration must be submitted in writing to the Registrar's Office no later than two weeks after the final mark has been released by the Registrar.

VII. GRADUATION

Registration in any program does not constitute an application for a degree or diploma.

An official application for graduation must be filled out and filed in the Registrar's Office thirty days prior to the Convocation at which the applicant hopes to graduate.

In cases in which credit is sought for work done elsewhere, official transcripts or other documentary evidence required by the Registrar's Office, not already submitted, must be conveyed to the Registrar's Office prior to the same date. Failure to comply with these regulations will disqualify the student for graduation at the Convocation concerned.

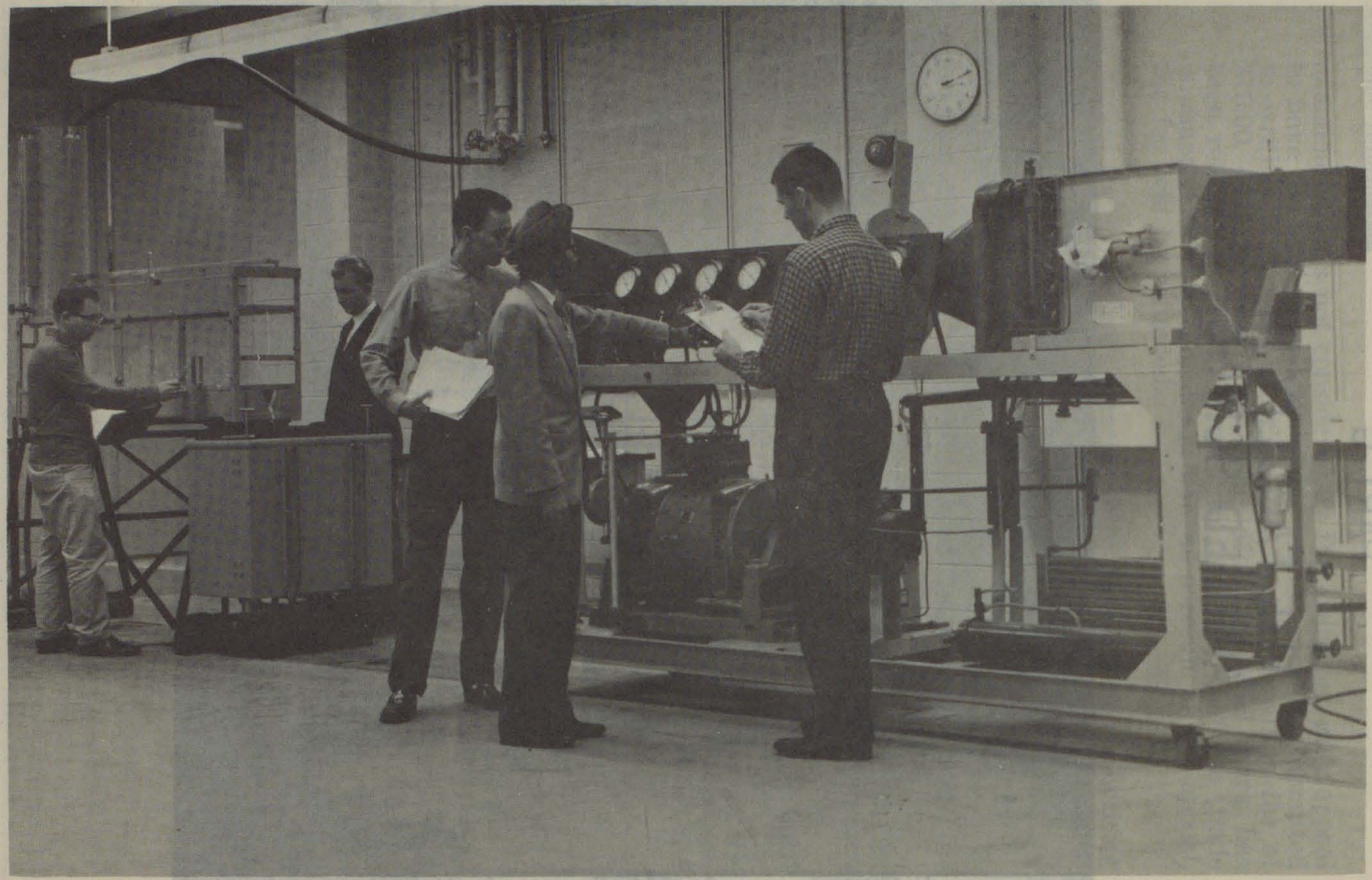
See also the particular regulations for each Faculty.

VIII. ANNUAL MEDICAL REQUIREMENT

Athletes are required to attend annually upon their own physician and present to the University on the University's prescribed form, a certificate as to physical fitness.

PART G

THE FACULTY OF APPLIED SCIENCE



FACULTY OF APPLIED SCIENCE

FACULTY COUNCIL

The Dean of the Faculty (Chairman); all faculty of professorial rank; student representatives as agreed.

ACADEMIC REGULATIONS

I. Special Admission Requirements:

Applicants for admission to First Year must have standing in the following Grade 11 and 12 subjects: English, Mathematics, Physics and Chemistry, as well as the following Grade 13 qualifications:

EITHER: An overall average of 60% or more, in a full Grade 13 program, with a minimum of 60% in Functions and Relations* and in any one of the following: Calculus*, Algebra*, Physics, Chemistry, Geology:

OR: An overall average of 75% in a full Grade 13 program, with no special requirements.

OR: Equivalent Preliminary Year (see below).

*As described in the Ontario Department of Education Curriculum S 12C Supplement, 1971. Functions and Relations is commonly designated Mathematics 1; Calculus, Mathematics 2; Algebra, Mathematics 3.

Although it is not compulsory, it is recommended that students wishing to enter the Faculty of Applied Science take Mathematics 1, 2, and 3, Physics and Chemistry in Grade 13. Any deficiencies in these subjects may require additional courses in the first year, with the possible payment of additional fees.

(See also General Admission Requirements, p. D-6).

II. General Regulations: see p. D-11.

III. Particular Regulations:

1. Student Evaluation
   (a) An average* of less than 55% constitutes failure of a year.
   (b) A grade of F of F– in four or more subjects, irrespective of the weight of the subject, takes precedence over a numerical average, and constitutes failure of a year.

*A weighted average is computed, in which, generally, each course is given a weight based upon one unit per semester-lecture, one-half unit per semester laboratory hour or tutorial hour.

(c) In a failed year, defined in (a) and (b), credit will be given for those subjects in which a grade of B or better was obtained.

(d) Supplemental examinations or extra work privileges will be granted to students that have not failed their year in those subjects in which a grade F was obtained.

(e) No supplemental examinations or extra work privileges will be granted in any subject graded F–. Subjects having this grade must appear on the student's registration in the following year, and must be repeated.

(f) Supplemental examinations in the Faculty of Applied Science will be held only during the summer period, when the University holds these examinations (see p. A-7). Unless undue hardship to the student can be demonstrated, no exception will be made.

(g) A new grade resulting from supplemental examination or extra work will be entered into the record of the student; but the original evaluation of the subject and the initially calculated average for the year will remain.

(h) A fulltime student who after three years of resident study is unqualified for promotion into a third year program, will be required to withdraw from the Faculty.

(i) A fulltime student will be required to withdraw from the Faculty if he cannot graduate after six years of resident study.

(j) So long as the student passes his year (see (a) and (b)) he may repeat failed courses in the subsequent year of his studies. He **must** give precedence to the repeated course, and will be advised by the appropriate Department Head (or his delegate) about his courses and work-load.

(k) No student carrying subjects from a previous year for which he had an overall grade less than C will be allowed to take a program whose load is greater than that of a normal year. If his grade were C or better, the appropriate Department Head (or his delegate) may allow an overload. In all cases of timetable conflicts, the repeated course takes precedence.

(l) All courses taken in a year of study (carried or regular) will be included in the computation of the average.

(m) The Academic Standing Committee of the Faculty comprises all members of Faculty as voting members. Representatives of other Faculties are invited, but do not vote. A quorum of the Committee is 20 voting members.

(n) The Academic Standing Committee considers appeals only if they are formally constituted and pass through the proper channels. (See p. D-13).

2. Grading

Based upon his weighted average grade for the year, each passing engineering student will be placed in one of four classes, 1st, 2nd, 3rd or 4th, which correspond to weighted average grades of A, B, C and D respectively.

3. Honours Standing

Honours: A student will graduate with honours standing if he has fulfilled all the requirements previously described, and has completed his course in four years with 2nd Class standing in the third and final years.

Honours with distinction: A student will graduate with honours with distinction if he has fulfilled all the requirements previously described, and has completed his course in four years with 1st Class standing in the third and final years.

Preliminary Year Engineering

Admission Requirements: see p. D-7.

Program:

English 110 or 115 or option from Group A, B, or C (see p. E-16);
Mathematics 010, Mathematics 020, Mathematics 030;
Any two of: Chemistry 001, Physics 010, Geology 100;
Library Orientation.

For admission to First Year Engineering a student must have an overall average of C.

BACHELOR OF APPLIED SCIENCE

The Curriculum:

The engineering curriculum has been designed to offer students an education that is immediately valuable to them on graduation and which, at the same time, provides a foundation to accommodate their further education in industry or research.

While an engineer must work within the technologies of the times, he is also responsible for their continual development: the creation of new processes, structures, materials, machines. The flexibility demanded of him must be based upon proficiency in the physical sciences, and a confident ability to apply the sciences to the benefit of mankind. Therefore our engineering programs are founded upon a substantial content of mathematics, physics and chemistry; and our engineering subjects are taught with a view to familiarising the student with contemporary practice, and teaching him those methods of analysis, design and realisation which he will be able to apply to a continually developing discipline.

The aim of the engineer is to use natural resources for the betterment of society: he must, therefore, realise his duties to society and, as a prerequisite, appreciate how civilisations have developed to their present states. To provide that perspective, then, in which the engineer may see the meaning of his work, the curriculum includes humanities and social science subjects.

The independent responsibility that we wish to see in practising engineers is impressed upon our students by an emphasis on assignments, the completion of which is made realistically possible through economical course load. Further, the student is assisted in his individual studies by a counselling program, which encourages a close and profitable student-teacher relationship.

NOTE: The curricula for Chemical, Civil, Electrical and Mechanical Engineering, and Engineering Materials, have been accepted by the Association of Professional Engineers of Ontario for purposes of registration of the graduates.

During the four-year program, Economics 101 or an equivalent approved by the Economics Department, and two approved courses in Arts and Social Sciences, must be taken.

For descriptions of courses, see "Details of Subjects", p. G-20.

	First Semester		Second Semester	
	Lect.	Lab.	Lect.	Lab.
FIRST YEAR				
(common to all Engineering programs)				
Chem. 111 (Gen. Chem.; Qual. Analysis)	3	3	3	3
Math. 114 (Diff. & Int. Calculus)	3	1	3	1
Math. 120a (Gen. Math. I)	2	1	0	0
Math. 130b (Linear Algebra)	0	0	2	1
G.E. 100 (Design & Graphics)	1	3	0	3
G.E. 101 (Mechanics)	2	2	2	2
G.E. 103ab (History of Engineering)	2	0	2	0
G.E. 104b (Magnetism & Electricity)	0	0	3	3
G.E. 105a (Engineering Computational Methods)	1	2	0	0

I. CHEMICAL ENGINEERING

Students contemplating careers in Chemical Engineering can look forward to employment opportunities in technical sales, plant and equipment design, process design and control, production, and basic research in such fields as fermentation, petroleum, synthetic plastics and detergents, protective coatings and a host of other related industries. The Chemical Engineering program is designed to give the student the basic requirements for such a future and allows him maximum opportunity to choose his field of interest.

The department laboratories are spacious, the equipment is modern and designed to illustrate all the up-to-date scientific principles used in Chemical Engineering practice. A considerable amount of highly specialized equipment, useful in special projects, particularly in the senior year and in post-graduate studies, is also available.

The Chemical Institute of Canada has accredited this course for the purpose of granting professional membership to its graduates. A Student Chapter of the C.I.C. is active on campus. This course has also been accredited by the Association of Professional Engineers of Ontario for purposes of registration of the graduates.

First Year

Common to all Engineering programs, see p. G-6.

	First Semester		Second Semester	
	Lect.	Lab.	Lect.	Lab.
Second Year				
Arts or Social Science option	(see requirements, p. G-6)			
Math. 211 (Intermediate Calculus)	3	1	3	1
Chem. 302a (Titrimetric & Gravimetric Anal.)	2	3	0	0
C.E. 200a (Methods of Computer Computation)	2	3	0	0
E.E. 200a (Electrical Networks and Systems)	2	3	0	0
Ch.E. 201b (Chemical Processes)	0	0	2	3
Ch.E. 202 (Intro. to Thermodynamics)	2	1½	2	1½
Ch.E. 203b (Instrumental Analysis)	0	0	2	3
Ch.E. 205b (Elementary Process Calc.)	0	0	2	1½
Third Year				
Arts or Social Science option	(see requirements, p.G-6)			
Chem. 223z (Organic Chemistry)	2	1½	2	1½
Ch.E. 301 (Transport Phenomena)	3	3	3	3
Ch.E. 302 (Chem. Eng. Thermodynamics)	3	1	3	1
Ch.E. 304 (Applied Physical Chemistry)	2	1½	2	1½
Ch.E. 305 (Intro. to Plant Design)	0	3	0	3
EITHER:				
E.M. 300z (Fund. Prop. of Materials)	2	1½	2	1½
OR				
C.E. 203a (Mechanics of Materials)	2	1½	0	0
AND				
E.M. 200b (Intro. to Engineering Materials)	0	0	3	1½
G.E. 302 (Practical Experience)				

Chemical Engineering

	First Semester Lect.	Lab.	Second Semester Lect.	Lab.
Fourth Year				
Arts or Social Science option	(see requirements, p. G-6)			
EITHER:				
C.E. 408a (Treatment of Experimental Data)				
OR				
Math 253c (Statistics)	2	1	0	0
G.E. 400b (Engineering Profession & Law)	0	0	2	0
Ch.E. 401 (Mass Transfer)	2	3	2	3
Ch.E. 403 (Process Dynamics and Control)	1	1½	1	1½
Ch.E. 404 (Chemical Reaction Engineering)	3	0	3	0
Ch.E. 405 (Plant Design)	0	3	0	3
Options to be chosen from the following and other possible courses on the recommendation of the department:	3 units		3 units	
Ch.E. 499 (Senior Project)	0	6	0	6
Chem. 333x (Organic Chemistry)	3	0	3	0
Chem. 447 (Modern Chemistry)	2	0	2	0
I.E. 301a (Intro. to Industrial Engineering)	2	3	0	0
I.E. 303a (Engineering Economy)	3	2	0	0
I.E. 401b (Prod. Control & Management)*	0	0	2	2
I.E. 402a (Operations Research)	3	2	0	0
I.E. 402b (Industrial Eng. Systems)*	0	0	2	3
E.M. 302b (Electrochemistry & Corrosion)	0	0	2	1½

*I.E. 303a is prerequisite for I.E. 401b and 402b.

II. CIVIL ENGINEERING

Civil Engineering comprises the conception, design, operation and maintenance of buildings, railroads, waterways, bridges, harbours, tunnels, water supply and purification systems, sewage collection and treatment facilities, hydraulic structures and water power developments. The Civil Engineering curriculum provides a diversity of applied course work to aid the student in selecting his major field of endeavour as well as a thorough background in the basic sciences and a broad understanding of the social sciences and humanities.

The Civil Engineering Department provides modern and comprehensive laboratory facilities in the following fields: Strength of Materials, Soil Mechanics, Hydraulics, Structures, Reinforced Concrete, Sanitary Engineering and Surveying.

This course has been accredited by the Association of Professional Engineers of Ontario for purposes of registration of the graduates.

First Year

Common to all Engineering programs, see p. G-6.

Second Year

	First Semester Lect.	First Semester Lab.	Second Semester Lect.	Second Semester Lab.
Arts or Social Science Option	(See requirements, p. G-6)			
G.E. 200a (Methods of Computer Computation)	2	3	0	0
Math. 211 (Intermediate Calculus)	3	1	3	1
C.E. 200b (Graphic Statics)	0	0	1	2
C.E. 201 (Mech. of Materials)	2	1½	2	1½
C.E. 202 (Surveying)	2	2	2	2
E.E. 200a (Electrical Networks and Systems)	2	3	0	0
M.E. 202a (Intro. to Thermodynamics)	2	1½	0	0
E.M. 200b (Prop. of Materials)	0	0	3	1½
G.E. 201b (Engineering Analysis I)	0	0	2	3

Third Year

Arts or Social Science Option	(See requirements, p. G-6)			
Geol. 331 (Geology in Engineering)	2	1	2	1
C.E. 300 (Structural Analysis & Design I)	3	2	3	2
C.E. 301 (Surveying Camp)				
C.E. 302 (Hydrology)	2	1½	1	1½
C.E. 303 (Soil Mechanics)	2	1½	2	1½
C.E. 304 (Reinforced Concrete)	2	1½	2	3
C.E. 305b (Construction Methods)	0	0	2	0
M.E. 300 (Fluid Mechanics)	2	1½	2	1½
G.E. 302 (Practical Experience)				

Fourth Year

Arts or Social Science Option	(See requirements, p. G-6)			
C.E. 400 (Structural Analysis & Design II)	2	3	2	3
C.E. 402 (Advanced Hydraulics)	2	1½	2	1½
C.E. 403 (Foundation Engineering)	2	1	2	1
C.E. 404 (Transportation Engineering)	2	0	2	1½
C.E. 405 (Environmental Engineering)	2	2	2	2
C.E. 407 (Urban Planning)	1	0	1	0
C.E. 408a (Treatment of Experimental Data)	2	1	0	0
C.E. 410b (Project & Seminar)	0	3	0	3
G.E. 400b (Engineering Profession & Law)	0	0	2	0

III. ELECTRICAL ENGINEERING

The electrical engineer develops and controls sources of electrical energy for the use and convenience of man. He may design, develop or manufacture electrical and electronic devices, provide engineering or managerial consulting services, or engage in research.

The Electrical Engineering curriculum with its core of fundamental engineering, mathematics and science courses together with the arts and social science options, will enable the graduate to interact meaningfully with society and technology. The required Electrical Engineering subjects within the curriculum provide the foundation of a professional education sufficiently fundamental to facilitate the graduate's placement in any branch of the wide field of Electrical Engineering.

An appropriate amount of specialization is possible in the area of interest to the student through the proper selection of elective courses offered in the third and fourth years. An especially comprehensive program of electives is available for students interested in computers.

The Electrical Engineering Department has well-equipped laboratories for conducting the practical instruction necessary to complement the program of theoretical studies.

The course has been accredited by the Association of Professional Engineers of Ontario for the purpose of registration of the graduates.

First Year

Common to all Engineering programs, see p. G-6.

	First Semester		Second Semester	
	Lect.	Lab.	Lect.	Lab.
Second Year				
Arts or Social Science Option	(See requirements, p. G-6)			
Math 211 (Intermediate Calculus)	3	1	3	1
Phys. 228a (Intro. to Atomic Physics)	2	1½	0	0
G.E. 200a (Methods of Computer Computation)	2	3	0	0
G.E. 201b (Engineering Analysis I)	0	0	2	3
E.M. 200b (Intro. to Engineering Materials)	0	0	3	1½
C.E. 203a (Mechanics of Materials)	2	1½	0	0
M.E. 202a (Intro. to Thermodynamics)	2	1½	0	0
E.E. 200a (Electrical Networks & Systems)	2	3	0	0
E.E. 202b (Circuit Analysis I)	0	0	2	3
E.E. 205b (Electrical Materials & Devices I)	0	0	2	3
Third Year				
Arts or Social Science Option	(See requirements, p. G-6)			
Math 217c (Complex Variables)	3	1	0	0
Math 253c (Statistics)	0	0	2	1
Math 361a (Fourier Series & P.D.E.)	2	0	0	0
E.E. 300b (Electromagnetic Theory I)	0	0	2	2
E.E. 302a (Circuit Analysis II)	2	1½	0	0
E.E. 303 (Electrical Energy Conversion)	2	3	2	1½
E.E. 304a (Electrical Measurements)	2	2	0	0
E.E. 306 (Electronic Circuits I)	2	2	2	2
E.E. 325b (Switching Circuit Theory)	0	0	2	1½
Elective				
C.S. 231b (Information Structures)	0	0	3	0
or				
Math 381c (Numerical Analysis)	0	0	3	0

Electrical Engineering

	First Semester		Second Semester	
	Lect.	Lab.	Lect.	Lab.
Fourth Year				
Arts or Social Science Option	(See requirements, p. G-6)			
G.E. 400b (Eng. Profession & Law)	0	0	2	0
E.E. 400a (Electromagnetic Theory II)	2	2	0	0
E.E. 407 (Control Theory)	2	1½	2	1½
E.E. 409a (Communications I)	2	1½	0	0
E.E. 410 (Project & Seminar)	0	3	0	3
E.E. 414b (Power Systems)	0	0	2	1½
E.E. 425a (Computer Systems I)	2	1½	0	0
Electives*				
E.E. 405b (Electrical Mat. & Devices II)	0	0	2	1½
E.E. 406a (Electronic Circuits II)	2	1½	0	0
E.E. 408a (Microwave Systems)	2	1½	0	0
E.E. 409b (Communications II)	0	0	2	1½
E.E. 425b (Computer Systems II)	0	0	2	1½
E.E. 433a (Analogue & Hybrid Computers)	2	1½	0	0
E.E. 460a (High Voltage Engineering)	2	1½	0	0
C.S. 301a (Simulation & Simulation Languages)	2	2	0	0
C.S. 331b (Specialized Computer Languages)	0	0	2	2
C.S. 332 (Operating Systems)	2	2	2	2
C.S. 422 (Theory of Automata & Formal Languages)	2	1½	2	1½
C.S. 431 (Language Processors)	2	2	2	2

*An acceptable program including electives will have from twelve to sixteen lecture hours per semester.

IV. ENGINEERING MATERIALS

One of the most diversified and challenging avenues open to future scientists and engineers is offered in the study of materials. Technological progress is dependent on how successfully the materials engineer can produce materials that will meet the demands of designers of nuclear reactors, gas turbine power plants, jet and rocket motors and many other space-age products. In addition, the materials engineer is concerned with the development and fabrication of materials for traditional use in structures, machines, plants, etc.

The Engineering Materials curriculum is essentially that of a scientifically oriented metallurgical program providing basic education in non-metallic as well as metallic materials and is designed to give the student, interested in the broad areas of materials generally, a strong background in the physical sciences, engineering principles and professional subjects.

The laboratories contain the latest instruments and equipment for undergraduate and graduate instruction and research. Of particular interest are the following major items: an electron probe micro-analyzer; an electron microscope; X-ray diffractometers with complete accessories; Leitz and Unitron metallographs and metallographic preparation and microscopy equipment; a material testing laboratory including an Instron Universal testing machine; processing equipment including a Phillips high frequency induction melting unit, a 1700° C. vacuum melting furnace, and other standard heat-treating equipment. In addition the Department has a well-equipped photographic laboratory.

This course has been accredited by the Association of Professional Engineers of Ontario for purposes of registration of the graduates.

First Year

Common to all Engineering Programs, see p. G-6.

	First Semester Lect.	First Semester Lab.	Second Semester Lect.	Second Semester Lab.
Second Year				
Arts or Social Science option	(see requirements, p. G-6)			
Math 211 (Intermediate Calculus)	3	1	3	1
G.E. 200a (Methods of Computer Computation)	2	3	0	0
Ch.E. 202a (Intro. to Thermodynamics)	2	1½	0	0
C.E. 201 (Mechanics of Materials)	2	1½	2	1½
E.E. 200a (Electrical Networks and Systems)	2	3	0	0
E.E. 206b (Electronic Circuits I)	0	0	2	3
E.M. 200b (Intro. to Engineering Materials)	0	0	3	1½
E.M. 201a (Intro. to Materials Processes)	1	1½	0	0
G.E. 201b (Engineering Analysis I)	0	0	2	3
Third Year				
Arts or Social Science option	(see requirements, p. G-6)			
Chem. 223z (Organic)	2	3	2	0
Math 253c (Statistics)	2	1	0	0
Math 361a (Fourier Series and P.D.E.)	2	0	0	0
Physics 228a (Elements of Atomic Physics)	2	1½	0	0
Physics 228b (Elements of Solid State Physics)	0	0	2	1½
E.M. 300 (Fund. Prop. of Materials)	2	6	2	3
E.M. 301b (Metallurg. Thermodyn. & Kinetics)	0	0	2	3
E.M. 303 (Ferrous Metallurgy)	2	1½	2	3
E.M. 309b (Seminar)	0	0	0	1½
G.E. 302 (Practical Experience)				

Engineering Materials

	First Semester		Second Semester	
	Lect.	Lab.	Lect.	Lab.
Fourth Year				
Arts or Social Science option	(see requirements, p. G-6)			
Chem. 433c (Special Topics in Organic Chemistry)	2	0	0	0
G.E. 400b (Engr. Profession & Law)	0	0	2	0
I.E. 301a (Intro. to Industrial Eng.)	2	3	0	0
E.M. 400 (Metallurgical Principles and Processes)	2	1½	2	1½
E.M. 401a (Mechanical Metallurgy)	2	1	0	0
E.M. 402b (Non-ferrous Extractive Metallurgy)	0	0	2	1
E.M. 403a (Fracture)	2	0	0	0
E.M. 405b (Ceramics)	0	0	2	1
E.M. 406b (Electrochem. & Corrosion)	0	0	2	3
E.M. 410 (Materials Research Project)	0	6	0	6
Approved Electives, approximately	2	0	2	0

V. GEOLOGICAL ENGINEERING

Responding to the demand for geological engineers both in Ontario and in the rest of Canada, the University of Windsor has approved a new program leading to a Bachelor of Applied Science degree (B.A.Sc.) in Geological Engineering in the Faculty of Applied Science. This program will complement existing programs, such as the four-year Honours B.Sc. in Geology, the three-year B.Sc. (General) and the Geology Minor.

Geological engineers are in great demand in exploration for ores, industrial minerals, petroleum and natural gas, in the production and exploitation of such deposits, in groundwater studies and in the growing field of environmental geology. Because of their short supply, geological engineers have commanded a premium above remuneration paid in all other fields requiring an equivalent amount of preparation.

The curriculum is designed to give the student a broad grasp of fundamentals allowing for on-the-job specialization or further training in graduate school without sacrificing maximum mobility in future years of employment or adaptability to the challenges of procuring new natural resources for a changing society.

Administration of the program rests with the Department of Geology, the curriculum being in the hands of a special committee comprising representatives of Geology, Civil Engineering and Engineering Materials.

Accreditation of this program by the Canadian Accreditation Board, for purposes of registration of the graduates, is in process.

First Year

Common to all Engineering programs, see page G-6.

Second Year

	First Semester Lect.	First Semester Lab.	Second Semester Lect.	Second Semester Lab.
Arts or Social Science option	(see requirements, p. G-6)			
Geology 100 (Introductory Geology)	2	2	2	2
Geology 220 (Mineralogy and Crystallography)	2	3	2	3
Math. 211 (Intermediate Calculus)	3	1	3	1
C.E. 202 (Surveying and Photogrammetry)	2	2	2	2
C.E. 203a (Mechanics of Materials)	2	1½	0	0
E.M. 200b (Properties of Materials)	0	0	3	1½
E.M. 301b (Metallurg. Thermodyn. & Kinetics)	0	0	2	3
G.E. 200a (Methods of Computer Computation)	2	3	0	0

Third Year

Arts or Social Science option	(see requirements, p. G-6)			
Geol. 336 (Structural Geology)	2	3	2	3
Geol. 337 (Igneous & Metamorphic Petrology)	2	3	2	3
Geol. 338 (Sedimentary Petrology)	2	3	2	3
C.E. 302 (Hydrology)	2	1½	1	1½
C.E. 303 (Soil Mechanics)	2	1½	2	1½
M.E. 300 (Fluid Mechanics)	2	1½	2	1½
C.E. 301 (Surveying Camp)				
G.E. 302 (Practical Experience)				

Geological Engineering

	First Semester Lect.	First Semester Lab.	Second Semester Lect.	Second Semester Lab.
Fourth Year				
Arts or Social Science option	(see requirements, p. G-6)			
Geol. 411ab (Engineering Geology)	2	3	2	3
Geol. 434a (Lithostratigraphy)	2	3	0	0
Geol. 441a (Economic Geology)	2	3	0	0
Geol. 442b (Geology of Fossil Fuels)	0	0	2	3
Geol. 448a (Hydrogeology)	2	3	0	0
Geol. 462 (Physics of the Earth)	2	3	2	3
Geol. 480c (Field Camp)	at end of third year			
Geol. 499 (Thesis)				
G.E. 400b (Engineering Profession and Law)	0	0	2	0
C.E. 553c (Groundwater and Seepage)	0	0	3	0
One of:				
E.M. 300 (Fundamental Props. of Materials)	2	6	2	3
Geol. 222ab (Paleontology)	2	3	2	3
Geol. 426 (Quaternary Geology)	2	3	2	3
Geol. 438 (Sedimentology)	2	3	2	3
Geol. 457 (Geochemistry)	2	3	2	3

The Fourth Year option is to be selected in consultation with the Department of Geology, and will depend on the student's proposed area of specialization.

VI. INDUSTRIAL ENGINEERING (B.A.Sc. in Mechanical Engineering)

Industrial Engineering is concerned with analysis, design, improvement, and operation of integrated systems of men, machines and materials. Industrial Engineers are employed in all fields of manufacturing, business organizations such as banks, railroads, airlines, insurance companies, and hospitals, to improve the cost and services of all functions. The increasing complexity of industrial operations and the expansion of automated processes, coupled with the continued growth of the nation's industries and keen sense of competition are the major factors contributing to an increase in the demand for industrial engineers each year.

Industrial Engineering draws from specialized knowledge and skill in the mathematical, physical and social sciences together with the principles and methods of engineering analysis and design to specify, predict and evaluate the results to be obtained from systems involving men, machines and materials. The industrial engineer should combine the basic aptitudes of an engineer with an understanding of the reactions of people in operating systems. About one half of the program of study consists of basic sciences and engineering courses, accompanied by studies in the humanities. The rest of the work is in the areas of conventional industrial engineering (i.e. plant flow analysis, work management and analysis, etc.), data processing, engineering economy, systems engineering and operations research.

Students who have completed the first two years of engineering at this University may enter the Third Year of Industrial Engineering.

	First Semester		Second Semester	
	Lect.	Lab.	Lect.	Lab.
Third Year				
Psych. 454 (Industrial Psychology) (required course within Arts & Soc. Sci. Requirements)	3	0	3	0
Math 217c (Complex Variables)	0	0	3	0
Math 253c (Probability & Statistics)	2	1	0	0
M.E. 300 (Fluid Mechanics)	2	1½	2	1½
I.E. 301a (Introd. to Ind. Eng.)	2	3	0	0
I.E. 301b (Work Analysis and Management)	0	0	2	3
I.E. 302b (Eng. Appl. of Prob. and Stat.)	0	0	2	2
I.E. 303a (Engineering Economy)	2	2	0	0
I.E. 304a (Operations Research I)	2	3	0	0
I.E. 304b (I.E. Computation)	0	0	1	3
Technical Elective: (one course per semester may be chosen from among the following):				
G.E. 301a (Eng. Analysis II)	2	2	0	0
M.E. 301a (Machine Dynamics)	3	3	0	0
M.E. 311b (Inst. Analysis)	0	0	2	3
M.E. 458b (Env. Effects & Control of Noise)	0	0	2	1½
Fourth Year				
Arts or Social Science option	(see requirements, p. G-6)			
I.E. 401 (Prod. Planning, Mgt. & Anal.)	2	2	2	2
I.E. 402a (Operations Research II)	3	2	0	0
I.E. 402b (Ind. Engin. Systems)	0	0	2	3
I.E. 403b (Human Factors in Eng. Syst.)	0	0	2	2
I.E. 404b (Tech. in Mgt. Control)	0	0	3	2
I.E. 409 (Case Studies and Seminar)	2	1	2	1
I.E. 410 (Project) (4 credit hours)				
I.E. 411a (Quality Control)	2	2	0	0
G.E. 400b (Engineering Prof. and Law)	0	0	2	0
M.E. 407a (Control Theory I)	3	3	0	0

VII. MECHANICAL ENGINEERING

Due to the broad scope and almost unlimited number of specialties falling within the field of mechanical engineering, it becomes impossible to concentrate on specialized fields of study. A firm foundation in the basic sciences and mathematics is essential. This emphasis is also made necessary because increasing numbers of mechanical engineering graduates are being employed in research and development in government and industry, or going on to further studies at the post-graduate level. Upon graduation, the mechanical engineer has open to him a great variety of jobs, the following fields being a few examples: power plant and engine design, refrigeration and air conditioning, turbomachinery design, gas dynamics and aeronautics, production and general industrial engineering. Such fields as Business Administration may also be followed at the graduate level. Since many mechanical engineers advance to management positions in industry and take on social responsibilities within their communities, the broad education as provided by study of the humanities is deemed necessary. The Department of Mechanical Engineering has modern up-to-date laboratories for both undergraduate and graduate studies. Equipment of special interest includes a closed circuit wind tunnel for boundary layer research, a hydraulic servo lab for control work and a diesel engine test bed completely instrumented for energy balance as well as cylinder pressure readings.

This course has been accredited by the Association of Professional Engineers of Ontario for purposes of registration of the graduates.

First Year

Common to all Engineering Programs, see p. G-6.

Second Year

	First Semester		Second Semester	
	Lect.	Lab.	Lect.	Lab.
Arts or Social Science option	(see requirements, p. G-6)			
G.E. 200a (Methods of Computer Computation)	2	3	0	0
Math 211 (Intermediate Calculus)	3	1	3	1
Math 253c (Statistics)	2	1	0	0
C.E. 201 (Mechanics of Materials)	2	1½	2	1½
E.M. 200b (Prop. of Materials)	0	0	3	1½
E.E. 200a (Electrical Networks and Systems)	2	3	0	0
E.E. 206b (Electronic Circuits 1)	0	0	2	3
G.E. 201b (Engineering Analysis I)	0	0	2	3
M.E. 202a (Intro. to Thermodynamics)	2	1½	0	0
M.E. 202b (Engin. Thermodynamics I)	0	0	1	1

Third Year

Arts or Social Science option	(see requirements, p. G-6)			
Math 253c (Statistics)	2	1	0	0
I.E. 302b (Eng. Appl. of Prob. & Stat.)	0	0	2	2
E.M. 310b (Engineering Metallurgy)	0	0	2	1½
G.E. 301a (Engineering Analysis II)	2	2	0	0
M.E. 300 (Fluid Mechanics)	2	1½	2	1½
M.E. 301a (Machine Dynamics)	3	3	0	0
M.E. 302 (Engineering Thermodynamics II)	2	2	2	2
M.E. 304b (Principles of Heat Transfer)	0	0	3	3
M.E. 305a (Stress Analysis)	2	2	0	0
M.E. 311b (Instrumentation Analysis)	0	0	2	3

	First Semester Lect.	First Semester Lab.	Second Semester Lect.	Second Semester Lab.
Fourth Year				
Arts or Social Science option	(see requirements, p. G-6)			
Physics 228a (Elements of Atomic Physics)	2	1½	0	0
G.E. 400b (Eng. Profession and Law)	0	0	2	0
*M.E. 400b (Kinematics)	2	2	0	0
M.E. 401 (Machine Design)	2	3	2	3
M.E. 407a (Control Theory I)	3	3	0	0
M.E. 413 (Thermo-Fluid System Design)	2	1½	2	1½
M.E. 410 (Project Laboratory) (4 credit hours)				
Approved electives, approximately	2	1½	4	3

*To be taught in 1973-74.

DETAILS OF SUBJECTS

(For details of subjects required of Engineering students and not listed below, see "Details of Subjects", p. G-39).

GENERAL ENGINEERING

Course Descriptions:

G.E. 100. Engineering Design and Graphics: A course in the fundamentals of creative engineering design, involving ideation, conceptualization, analysis and finally the unique problem solution. Graphics will be stressed as an important tool for communication of ideas by means of sketches and engineering drawings. **(1 lecture a week, first semester; 3 laboratory hours a week all year).**

G.E. 101. Mechanics: Statics of particles and rigid bodies; centroids and centres of gravity; structural analysis; friction; moments of inertia; kinematics of particles and rigid bodies; kinetics of particles and rigid bodies; work, energy, impulse and momentum methods; plane motion of rigid bodies. (Prerequisites: Math 1 and Math 2 or equivalents). **(2 lectures, 2 laboratory hours a week, both semesters).**

G.E. 103a. A History of Engineering—to 1750: Language, tools, cultures and civilizations; science and engineering in the Ancient World; technology in the Middle Ages, with particular reference to feudalism, war, commerce and the clock; architecture and machines in the Renaissance; the scene laid for the Industrial Revolution. **(2 hours a week, first semester; half course).** (Students will be evaluated on a pass/non-pass basis.

G.E. 103b. A History of Engineering—from 1750: Power and materials in the Industrial Revolution; transportation; communications; the growth of the chemical industry; machine tools and the development of the modern factory; the interplay of science and engineering. **(2 hours a week, second semester; half course).** Students will be evaluated on a pass/non-pass basis).

G.E. 104b. Introductory Electricity and Magnetism: Electrostatic field concepts, capacitance, dielectrics, static magnetic field concepts and applications, direct current circuit concepts and analysis techniques, induced electromotive force, magnetic properties of matter. **(3 lecture hours, 3 laboratory hours, second semester; half course).**

G.E. 105a. Engineering Computational Methods: Review of mathematical functions. Computational techniques. Errors in computation. Graphical techniques. Algorithmic methods for digital computation. Fortran programming. **(1 lecture, 2 tutorial hours a week, first semester; half course).**

G.E. 200a. Methods of Computer Computation: The application of digital and analogue computers to the solution of engineering problems including: algebraic, ordinary differential and simultaneous equations, interpolation and curve fitting of data. (Prerequisite: G.E. 105a). **(2 lectures, 3 laboratory hours a week, first semester; half course).**

G.E. 201b. Engineering Analysis I: The selection and analysis of lumped parameter systems by exact and approximate methods is illustrated primarily with systems utilizing mechanical, electrical and fluid components. Analogies are drawn wherever possible. **(2 lectures, 3 hours laboratory a week. second semester; half course).**

G.E. 301a. Engineering Analysis II: The selection and analysis of distributed parameter systems by exact and approximate methods is illustrated primarily through examples involving deformation, wave propagation and vibrations in elastic media and various transport phenomena. Analogues will be discussed and used wherever possible. **(2 lectures, 2 hours laboratory a week, first semester; half course).**

G.E. 302. Practical Experience: Every student must fulfil the requirement of practical experience, normally during the vacation period between third and fourth years. The work that the student proposes to do must be approved by the Director of Industrial Liaison who will, where necessary, consult with the student's counsellor. A report of the vacation work, together with a statement from the employer, should be handed to the Director of Industrial Liaison before December 1st of the student's final year. This will be appraised by the department and, should it not be satisfactory, graduation may be delayed until evidence of adequate practical experience is offered. The student may, if he wishes, submit a report of work performed during an earlier vacation period. However, it is unlikely that work performed during his first vacation will be sufficiently advanced to satisfy the requirements. While it is the student's responsibility to find suitable vacation work, he will be assisted by the Manpower Office, his counsellor, and by the Director of Industrial Liaison.

G.E. 400b. Engineering Profession and Law: The development of the engineering profession; professional engineering associations, societies and services; the status of the engineer in the community; professional ethics. The duties and liabilities of engineers. The law and the engineer; contract law and specifications; preparation of specifications and engineering contract documents. **(2 lectures a week, second semester; half course).**

CHEMICAL ENGINEERING

Officers of Instruction:

Professors: Frank A. DeMarco, Ph.D.
Maurice Adelman, Ph.D. (Head of the Department)
*A. W. Gnyp, Ph.D.
R. A. Stager, Ph.D.

Associate Professors: G. P. Mathur, Ph.D.
C. C. St. Pierre, Ph.D.
M. B. Powley, M.A. Sc.

Visiting Lecturer: J. G. Braks, M.A.Sc.

*On leave.

Course Descriptions

Ch.E. 201b. Chemical Processes: The study of unit processes in chemical engineering and their integration in some selected industries, taught through discussion, laboratory exercise and a research approach to the development of simple known chemical processes on a laboratory scale. **(2 lectures a week, 3 hours laboratory and discussion, second semester; half course).**

Ch.E. 202a. Introduction to Thermodynamics: Fundamental concepts and definitions, First Law, physical properties, ideal and real gases, Second Law and entropy. **(2 lectures a week, 3 laboratory hours alternate weeks; first semester).**

Ch.E. 202b. Introduction to Thermodynamics: Second Law and its implications, thermophysical properties and their determination. **(2 lectures a week, 3 laboratory hours alternate weeks, second semester; half course).**

Ch.E. 202. Introduction to Thermodynamics: A combined course of Ch.E. 202a and Ch.E. 202b.

Ch.E. 203b. Instrumental Analysis: Introduction to physico-chemical measurements. **(2 lectures a week, 3 hours laboratory, second semester; half course).**

Ch.E. 205b. Elementary Process Calculations: Introduction to graphical methods. Stoichiometry, material and energy balances in chemical and metallurgical processes. **(2 lectures, 3 laboratory hours alternate weeks, second semester; half course).**

Ch.E. 301. Transport Phenomena: The simultaneous study of heat and momentum transfer; derivation of the diffusion equation, Laplace's equation, the Navier-Stokes equation and Bernoulli's equation; forced and free convection, laminar and turbulent flow; dimensional analysis; solution of the equations; radiative heat transfer. Laboratory periods embodying experiments and calculations to demonstrate practical problems in heat and momentum transfer. Practical heat transfer; design of heat transfer equipment. Pressure drop and energy requirement calculations, one and two phase systems. The physical separation of solids, screening, filtration, elutriation, fluidization. **(3 lectures, 3 laboratory hours a week, both semesters).**

Ch.E. 301az. Transport Phenomena I: The first half of Ch.E. 301. **(3 lectures, 1½ laboratory hours a week, first semester; half course).**

Ch.E. 302. Chemical Engineering Thermodynamics: The application of thermodynamic principles to chemical engineering practice. **(3 lectures, 1 tutorial a week, both semesters).**

Ch.E. 303. Instrumental Analysis: Physico-chemical measurements used in industry, and the determination of properties. **(1 lecture, 3 laboratory hours a week; both semesters).**

Ch.E. 304. Applied Physical Chemistry: Equilibria in chemically reactive systems, physico-chemical measurements, classification of chemical reactions, computer analysis of rate processes. **(2 lectures, 1½ laboratory hours a week).**

Ch.E. 305. Introduction to Plant Design: Fundamentals of plant design practice; problem solving and decision making for simple chemical processes; the economic considerations. **(3 tutorial hours a week both semesters).**

Ch.E. 401. Mass Transfer: Methods of solution of problems in distillation, extraction, gas absorption, leaching. Introduction to the general theory of transport phenomena. Illustration of the principles of mass transfer operations through laboratory sessions arranged on an incentive basis. **(2 lectures a week, 3 laboratory hours a week; both semesters).**

Ch.E. 403. Process Dynamics and Control: Mathematical modelling, Laplace transform solution of differential equations, transfer functions, feedback control modes, open and closed loop transient response under various control modes, stability, applications to practical Chemical Engineering problems. **(1 lecture, 1½ laboratory hours a week, both semesters).**

Ch.E. 404. Chemical Reaction Engineering: The rate equation, ideal reactor concept. Design of back mix and plug flow reactors. Design considerations for multiple reactions. Heat transfer considerations. Corrections for non-ideality. Introduction to theory of catalysis. Physical factors in heterogeneous reactions. **(3 lectures a week, both semesters).**

Ch.E. 405. Economics and Plant Design: Economic and technical aspects of plant design are covered, along with optimization studies and the effect on a design of the uncertainty of some of the parameters. Scale-up from pilot plants is also studied. **(3 tutorial hours a week both semesters).**

Ch.E. 499. Senior Project: A full literature study on the technical factors involved in the establishing of a chemical industry. Directed experimental research. **(6 laboratory hours a week, both semesters).**

CIVIL ENGINEERING

Officers of Instruction:

Professors: *J. B. Kennedy, Ph.D. (Head of the Department)
C. MacInnis, Ph.D.

Associate Professors: J. P. Hartt, M.S.C.E.
J. T. Laba, Ph.D.
G. Monforton, Ph.D.
J. A. McCorquodale, Ph.D.
G. Abdel-Sayed, Dr. Ing.
S. P. Chee, Ph.D.
J. K. Bewtra, Ph.D.

Assistant Professors: M. C. Temple, Ph.D.
M. K. S. Murty, Ph.D. (Visiting)

*On leave.

Course Descriptions

C.E. 200b. Graphic Statics: An introduction consisting of resolution and composition of forces, force polygons, and equilibrium conditions is followed by a study of funicular polygons; reactions of beams, trusses and three-hinged arches; Maxwell's diagram including substitute members; lines of resistance in dams; and the Williot and Williot-Mohr diagram. (Prerequisites: G.E. 100 and G.E. 101 or equivalents). **(1 lecture hour, 2 laboratory hours a week; second semester; half course).**

C.E. 201. Mechanics of Materials: An introduction to stress, Mohr's circle, strain, stress-strain relations, and a brief discussion of mechanical properties of materials and types of loads. A study of members subjected to axial load, torsion and flexure. Also included is a discussion of eccentric loads, deflection of beams, connections, buckling of columns and additional beam topics. Statically indeterminate problems, and inelastic response are also studied. (Prerequisites: G.E. 101 and Math 114 or equivalents). **(2 lectures a week, 3 laboratory hours alternate weeks; both semesters).**

C.E. 202. Surveying: A complete course in the theory of plane surveying, practical astronomy and the rudiments of aerial photogrammetry. Field problems and computations are provided in the laboratory periods to supplement the lectures. (No prerequisite). **(2 lectures, 2 laboratory hours a week).**

C.E. 203a. Mechanics of Materials: An introduction to stress and strain and stress-strain relations. A brief discussion of mechanical properties of materials and types of loads. A study of members subjected to axial load, torsion and bending. (Prerequisites: G.E. 101 and Mathematics 114 or equivalents). **(2 lectures a week, 3 laboratory hours alternate weeks; first semester; half course).**

C.E. 300. Structural Analysis and Design I:

Analysis: Stability and determinacy of structures; analysis of plane and space trusses; deflections of structures by virtual work, Castigliano and conjugate beam methods; Maxwell-Batti reciprocal theorem; cables, suspension bridges and three-hinged arches; influence lines; approximate analysis of indeterminate structures. Matrix methods of analysis of determinate structures.

Design: Loads acting on a structure; properties of steel and timber; development of specifications and Codes of Practice in steel and timber. **Steel**—tension, compression and bending members, and connections. **Timber**—classification, allowable stresses, fastenings, timber piles, compression and bending members; laminated glued timber. Design of simple structures in steel and timber. (Prerequisites: C.E. 200b and C.E. 201 or equivalent). **(3 lectures, 2 laboratory hours a week).**

C.E. 301. Surveying Camp: A field course covering secondary triangulation; precise base line measurement; plane table topography, cross sectioning and earth work; and observation for time and azimuth. (Prerequisite: C.E. 202 or equivalent). (See "Fees"). **(2 weeks).**

C.E. 302. Hydrology: Hydrologic cycle. Precipitation. Intensity-duration-frequency. Evapo-transpiration losses. Runoff, stream gaging, estimation from meteorological data. Storms, flood flows, rational and unit graph methods, flood routing, weather and water control. (No prerequisite). **(2 lectures a week, first semester; 1 lecture a week, second semester; 3 laboratory hours alternate weeks, both semesters).**

C.E. 303. Soil Mechanics: Index properties of soils, soil structure and classification of soils. Soil compaction and stabilization. Hydraulic principles of flow through soils, seepage, flow nets. Compressibility, consolidation and settlement analysis. Shearing strength, stress analysis and stability of slopes. (Prerequisite: C.E. 201 or equivalent). **(2 lectures a week, 3 laboratory hours alternate weeks).**

C.E. 304. Reinforced Concrete: Stress analysis and design of reinforced concrete beams and columns; combined bending and axial load; ultimate strength and analysis; different floor systems of reinforced concrete building; introduction to prestressed concrete. Laboratory includes design problems and tests of physical properties of concrete and its component materials; design of concrete mixes. (Prerequisite: C.E. 201 or equivalent). **(2 lectures a week, both semesters; 3 laboratory hours, alternate weeks, first semester, and 3 laboratory hours a week, second semester).**

C.E. 305b Construction Methods: The course is divided into three parts. The first part is a discussion of the critical path method (CPM) including time scheduling, manpower and equipment levelling, and updating. This is followed by a discussion of linear programming and its application to engineering problems. The last part of the course includes a discussion of specifications, contract drawings, field inspection, and contract preparation and administration. (No prerequisite). **(2 lectures a week, second semester; half course).**

C.E. 400. Structural Analysis and Design II: Analysis of statically indeterminate structures: superposition, Castigliano theory, column analogy, moment distribution, slope-deflection, matrix methods; influence lines. Design of plate girder; plastic design of steel structures; light gauge cold-formed steel; composite structures; plywood and timber structures. (Prerequisites: C.E. 300 and C.E. 304 or equivalents). **(2 lectures, 3 laboratory hours a week).**

C.E. 402. Advanced Hydraulics: Energy losses due to friction, changes in cross-section and alignment. Pressure conduits in series, parallel and network. Water hammer and surge tanks. Open channel flow, sediment transport and waves. Spillways, weirs and outlet works. Pumps and turbines. Hydraulic models. Gravity and arch dams. (Prerequisite: M.E. 300 or equivalent). **(2 lectures a week, 3 laboratory hours alternate weeks and inspection trips).**

C.E. 403. Foundation Engineering: Earth pressure and design of retaining walls, sheet piling, bearing capacity, stability of slopes, piles and pile driving; cofferdams, caissons; design of reinforced concrete raft and pile foundations. (Prerequisites: C.E. 300 and C.E. 303 or equivalents). **(2 lectures, 1 laboratory hour a week).**

C.E. 404. Transportation Engineering: Highways: Introduction to transportation planning and traffic engineering. Geometric design of highways. Design of rigid and flexible pavements, including foundation soils, sub-bases and bases as well as bituminous and concrete pavements. **Airports:** pavement design, and drainage problems. (Prerequisite: C.E. 201 or equivalent). **(2 lectures a week, both semesters, 3 laboratory hours alternate weeks, second semester).**

C.E. 405. Environmental Engineering: Principles of design, construction, and maintenance of facilities for water supply and waste water removal. Introduction to water purification and waste water treatment practices. Analysis of important characteristics of water and waste water. (Prerequisite: M.E. 300 or equivalent). **(2 lectures, 2 laboratory hours a week).**

C.E. 407. Urban Planning: History of development of cities, various factors influencing the city plan and elements of proper city-planning. The Planning Act, the Department of Planning and Development, and local planning boards. Urban renewal, proper zoning and other legislation that can be employed to develop healthy communities. (No prerequisite). **(1 lecture a week).**

C.E. 408a. Treatment of Experimental Data: Frequency distributions; measure of central tendency and dispersion; probability; discrete and continuous distributions; the Chi, "t", and the "F" ratio tests; linear and non-linear trends; principle of least squares; correlations; tolerance and control charts; introduction to analysis of variance. Applications. (Prerequisite: Mathematics 114 or equivalent). **(2 lectures, 1 laboratory hour a week, first semester; half course).**

C.E. 410. Project and Seminar: Students are required to complete a project based on experimental research, field investigation, or advanced design or analysis. The project is presented orally at a seminar, which is followed by a question period. A written report is submitted for evaluation. **(3 laboratory hours a week).**

IV. ENGINEERING MATERIALS

One of the most diversified and challenging avenues open to future scientists and engineers is offered in the study of materials. Technological progress is dependent on how successfully the materials engineer can produce materials that will meet the demands of designers of nuclear reactors, gas turbine power plants, jet and rocket motors and many other space-age products. In addition, the materials engineer is concerned with the development and fabrication of materials for traditional use in structures, machines, plants, etc.

The Engineering Materials curriculum is essentially that of a scientifically oriented metallurgical program providing basic education in non-metallic as well as metallic materials and is designed to give the student, interested in the broad areas of materials generally, a strong background in the physical sciences, engineering principles and professional subjects.

The laboratories contain the latest instruments and equipment for undergraduate and graduate instruction and research. Of particular interest are the following major items: an electron probe micro-analyzer; an electron microscope; X-ray diffractometers with complete accessories; Leitz and Unitron metallographs and metallographic preparation and microscopy equipment; a material testing laboratory including an Instron Universal testing machine; processing equipment including a Phillips high frequency induction melting unit, a 1700° C. vacuum melting furnace, and other standard heat-treating equipment. In addition the Department has a well-equipped photographic laboratory.

This course has been accredited by the Association of Professional Engineers of Ontario for purposes of registration of the graduates.

First Year

Common to all Engineering Programs, see p. G-6.

	First Semester		Second Semester	
	Lect.	Lab.	Lect.	Lab.
Second Year				
Arts or Social Science option	(see requirements, p. G-6)			
Math 211 (Intermediate Calculus)	3	1	3	1
G.E. 200a (Methods of Computer Computation)	2	3	0	0
Ch.E. 202a (Intro. to Thermodynamics)	2	1½	0	0
C.E. 201 (Mechanics of Materials)	2	1½	2	1½
E.E. 200a (Electrical Networks and Systems)	2	3	0	0
E.E. 206b (Electronic Circuits I)	0	0	2	3
E.M. 200b (Intro. to Engineering Materials)	0	0	3	1½
E.M. 201a (Intro. to Materials Processes)	1	1½	0	0
G.E. 201b (Engineering Analysis I)	0	0	2	3
Third Year				
Arts or Social Science option	(see requirements, p. G-6)			
Chem. 223z (Organic)	2	3	2	0
Math 253c (Statistics)	2	1	0	0
Math 361a (Fourier Series and P.D.E.)	2	0	0	0
Physics 228a (Elements of Atomic Physics)	2	1½	0	0
Physics 228b (Elements of Solid State Physics)	0	0	2	1½
E.M. 300 (Fund. Prop. of Materials)	2	6	2	3
E.M. 301b (Metallurg. Thermodyn. & Kinetics)	0	0	2	3
E.M. 303 (Ferrous Metallurgy)	2	1½	2	3
E.M. 309b (Seminar)	0	0	0	1½
G.E. 302 (Practical Experience)				

Engineering Materials

	First Semester Lect.	Lab.	Second Semester Lect.	Lab.
Fourth Year				
Arts or Social Science option	(see requirements, p. G-6)			
Chem. 433c (Special Topics in Organic Chemistry)	2	0	0	0
G.E. 400b (Engr. Profession & Law)	0	0	2	0
I.E. 301a (Intro. to Industrial Eng.)	2	3	0	0
E.M. 400 (Metallurgical Principles and Processes)	2	1½	2	1½
E.M. 401a (Mechanical Metallurgy)	2	1	0	0
E.M. 402b (Non-ferrous Extractive Metallurgy)	0	0	2	1
E.M. 403a (Fracture)	2	0	0	0
E.M. 405b (Ceramics)	0	0	2	1
E.M. 406b (Electrochem. & Corrosion)	0	0	2	3
E.M. 410 (Materials Research Project)	0	6	0	6
Approved Electives, approximately	2	0	2	0

V. GEOLOGICAL ENGINEERING

Responding to the demand for geological engineers both in Ontario and in the rest of Canada, the University of Windsor has approved a new program leading to a Bachelor of Applied Science degree (B.A.Sc.) in Geological Engineering in the Faculty of Applied Science. This program will complement existing programs, such as the four-year Honours B.Sc. in Geology, the three-year B.Sc. (General) and the Geology Minor.

Geological engineers are in great demand in exploration for ores, industrial minerals, petroleum and natural gas, in the production and exploitation of such deposits, in groundwater studies and in the growing field of environmental geology. Because of their short supply, geological engineers have commanded a premium above remuneration paid in all other fields requiring an equivalent amount of preparation.

The curriculum is designed to give the student a broad grasp of fundamentals allowing for on-the-job specialization or further training in graduate school without sacrificing maximum mobility in future years of employment or adaptability to the challenges of procuring new natural resources for a changing society.

Administration of the program rests with the Department of Geology, the curriculum being in the hands of a special committee comprising representatives of Geology, Civil Engineering and Engineering Materials.

Accreditation of this program by the Canadian Accreditation Board, for purposes of registration of the graduates, is in process.

First Year

Common to all Engineering programs, see page G-6.

	First Semester		Second Semester	
	Lect.	Lab.	Lect.	Lab.
Second Year				
Arts or Social Science option	(see requirements, p. G-6)			
Geology 100 (Introductory Geology)	2	2	2	2
Geology 220 (Mineralogy and Crystallography)	2	3	2	3
Math. 211 (Intermediate Calculus)	3	1	3	1
C.E. 202 (Surveying and Photogrammetry)	2	2	2	2
C.E. 203a (Mechanics of Materials)	2	1½	0	0
E.M. 200b (Properties of Materials)	0	0	3	1½
E.M. 301b (Metallurg. Thermodyn. & Kinetics)	0	0	2	3
G.E. 200a (Methods of Computer Computation)	2	3	0	0
Third Year				
Arts or Social Science option	(see requirements, p. G-6)			
Geol. 336 (Structural Geology)	2	3	2	3
Geol. 337 (Igneous & Metamorphic Petrology)	2	3	2	3
Geol. 338 (Sedimentary Petrology)	2	3	2	3
C.E. 302 (Hydrology)	2	1½	1	1½
C.E. 303 (Soil Mechanics)	2	1½	2	1½
M.E. 300 (Fluid Mechanics)	2	1½	2	1½
C.E. 301 (Surveying Camp)				
G.E. 302 (Practical Experience)				

Geological Engineering

	First Semester Lect.	Lab.	Second Semester Lect.	Lab.
Fourth Year				
Arts or Social Science option	(see requirements, p. G-6)			
Geol. 411ab (Engineering Geology)	2	3	2	3
Geol. 434a (Lithostratigraphy)	2	3	0	0
Geol. 441a (Economic Geology)	2	3	0	0
Geol. 442b (Geology of Fossil Fuels)	0	0	2	3
Geol. 448a (Hydrogeology)	2	3	0	0
Geol. 462 (Physics of the Earth)	2	3	2	3
Geol. 480c (Field Camp)	at end of third year			
Geol. 499 (Thesis)				
G.E. 400b (Engineering Profession and Law)	0	0	2	0
C.E. 553c (Groundwater and Seepage)	0	0	3	0
One of:				
E.M. 300 (Fundamental Props. of Materials)	2	6	2	3
Geol. 222ab (Paleontology)	2	3	2	3
Geol. 426 (Quaternary Geology)	2	3	2	3
Geol. 438 (Sedimentology)	2	3	2	3
Geol. 457 (Geochemistry)	2	3	2	3

The Fourth Year option is to be selected in consultation with the Department of Geology, and will depend on the student's proposed area of specialization.

VI. INDUSTRIAL ENGINEERING (B.A.Sc. in Mechanical Engineering)

Industrial Engineering is concerned with analysis, design, improvement, and operation of integrated systems of men, machines and materials. Industrial Engineers are employed in all fields of manufacturing, business organizations such as banks, railroads, airlines, insurance companies, and hospitals, to improve the cost and services of all functions. The increasing complexity of industrial operations and the expansion of automated processes, coupled with the continued growth of the nation's industries and keen sense of competition are the major factors contributing to an increase in the demand for industrial engineers each year.

Industrial Engineering draws from specialized knowledge and skill in the mathematical, physical and social sciences together with the principles and methods of engineering analysis and design to specify, predict and evaluate the results to be obtained from systems involving men, machines and materials. The industrial engineer should combine the basic aptitudes of an engineer with an understanding of the reactions of people in operating systems. About one half of the program of study consists of basic sciences and engineering courses, accompanied by studies in the humanities. The rest of the work is in the areas of conventional industrial engineering (i.e. plant flow analysis, work management and analysis, etc.), data processing, engineering economy, systems engineering and operations research.

Students who have completed the first two years of engineering at this University may enter the Third Year of Industrial Engineering.

	First Semester		Second Semester	
	Lect.	Lab.	Lect.	Lab.
Third Year				
Psych. 454 (Industrial Psychology) (required course within Arts & Soc. Sci. Requirements)	3	0	3	0
Math 217c (Complex Variables)	0	0	3	0
Math 253c (Probability & Statistics)	2	1	0	0
M.E. 300 (Fluid Mechanics)	2	1½	2	1½
I.E. 301a (Introd. to Ind. Eng.)	2	3	0	0
I.E. 301b (Work Analysis and Management)	0	0	2	3
I.E. 302b (Eng. Appl. of Prob. and Stat.)	0	0	2	2
I.E. 303a (Engineering Economy)	2	2	0	0
I.E. 304a (Operations Research I)	2	3	0	0
I.E. 304b (I.E. Computation)	0	0	1	3
Technical Elective: (one course per semester may be chosen from among the following):				
G.E. 301a (Eng. Analysis II)	2	2	0	0
M.E. 301a (Machine Dynamics)	3	3	0	0
M.E. 311b (Inst. Analysis)	0	0	2	3
M.E. 458b (Env. Effects & Control of Noise)	0	0	2	1½
Fourth Year				
Arts or Social Science option	(see requirements, p. G-6)			
I.E. 401 (Prod. Planning, Mgt. & Anal.)	2	2	2	2
I.E. 402a (Operations Research II)	3	2	0	0
I.E. 402b (Ind. Engin. Systems)	0	0	2	3
I.E. 403b (Human Factors in Eng. Syst.)	0	0	2	2
I.E. 404b (Tech. in Mgt. Control)	0	0	3	2
I.E. 409 (Case Studies and Seminar)	2	1	2	1
I.E. 410 (Project) (4 credit hours)				
I.E. 411a (Quality Control)	2	2	0	0
G.E. 400b (Engineering Prof. and Law)	0	0	2	0
M.E. 407a (Control Theory I)	3	3	0	0

VII. MECHANICAL ENGINEERING

Due to the broad scope and almost unlimited number of specialties falling within the field of mechanical engineering, it becomes impossible to concentrate on specialized fields of study. A firm foundation in the basic sciences and mathematics is essential. This emphasis is also made necessary because increasing numbers of mechanical engineering graduates are being employed in research and development in government and industry, or going on to further studies at the post-graduate level. Upon graduation, the mechanical engineer has open to him a great variety of jobs, the following fields being a few examples: power plant and engine design, refrigeration and air conditioning, turbomachinery design, gas dynamics and aeronautics, production and general industrial engineering. Such fields as Business Administration may also be followed at the graduate level. Since many mechanical engineers advance to management positions in industry and take on social responsibilities within their communities, the broad education as provided by study of the humanities is deemed necessary. The Department of Mechanical Engineering has modern up-to-date laboratories for both undergraduate and graduate studies. Equipment of special interest includes a closed circuit wind tunnel for boundary layer research, a hydraulic servo lab for control work and a diesel engine test bed completely instrumented for energy balance as well as cylinder pressure readings.

This course has been accredited by the Association of Professional Engineers of Ontario for purposes of registration of the graduates.

First Year

Common to all Engineering Programs, see p. G-6.

Second Year

	First Semester Lect.	First Semester Lab.	Second Semester Lect.	Second Semester Lab.
Arts or Social Science option	(see requirements, p. G-6)			
G.E. 200a (Methods of Computer Computation)	2	3	0	0
Math 211 (Intermediate Calculus)	3	1	3	1
Math 253c (Statistics)	2	1	0	0
C.E. 201 (Mechanics of Materials)	2	1½	2	1½
E.M. 200b (Prop. of Materials)	0	0	3	1½
E.E. 200a (Electrical Networks and Systems)	2	3	0	0
E.E. 206b (Electronic Circuits 1)	0	0	2	3
G.E. 201b (Engineering Analysis I)	0	0	2	3
M.E. 202a (Intro. to Thermodynamics)	2	1½	0	0
M.E. 202b (Engin. Thermodynamics I)	0	0	1	1

Third Year

Arts or Social Science option	(see requirements, p. G-6)			
Math 253c (Statistics)	2	1	0	0
I.E. 302b (Eng. Appl. of Prob. & Stat.)	0	0	2	2
E.M. 310b (Engineering Metallurgy)	0	0	2	1½
G.E. 301a (Engineering Analysis II)	2	2	0	0
M.E. 300 (Fluid Mechanics)	2	1½	2	1½
M.E. 301a (Machine Dynamics)	3	3	0	0
M.E. 302 (Engineering Thermodynamics II)	2	2	2	2
M.E. 304b (Principles of Heat Transfer)	0	0	3	3
M.E. 305a (Stress Analysis)	2	2	0	0
M.E. 311b (Instrumentation Analysis)	0	0	2	3

	First Semester Lect.	Lab.	Second Semester Lect.	Lab.
Fourth Year				
Arts or Social Science option	(see requirements, p. G-6)			
Physics 228a (Elements of Atomic Physics)	2	1½	0	0
G.E. 400b (Eng. Profession and Law)	0	0	2	0
*M.E. 400b (Kinematics)	2	2	0	0
M.E. 401 (Machine Design)	2	3	2	3
M.E. 407a (Control Theory I)	3	3	0	0
M.E. 413 (Thermo-Fluid System Design)	2	1½	2	1½
M.E. 410 (Project Laboratory) (4 credit hours)				
Approved electives, approximately	2	1½	4	3

*To be taught in 1973-74.

DETAILS OF SUBJECTS

(For details of subjects required of Engineering students and not listed below, see "Details of Subjects", p. G-39).

GENERAL ENGINEERING

Course Descriptions:

G.E. 100. Engineering Design and Graphics: A course in the fundamentals of creative engineering design, involving ideation, conceptualization, analysis and finally the unique problem solution. Graphics will be stressed as an important tool for communication of ideas by means of sketches and engineering drawings. **(1 lecture a week, first semester; 3 laboratory hours a week all year).**

G.E. 101. Mechanics: Statics of particles and rigid bodies; centroids and centres of gravity; structural analysis; friction; moments of inertia; kinematics of particles and rigid bodies; kinetics of particles and rigid bodies; work, energy, impulse and momentum methods; plane motion of rigid bodies. (Prerequisites: Math 1 and Math 2 or equivalents). **(2 lectures, 2 laboratory hours a week, both semesters).**

G.E. 103a. A History of Engineering—to 1750: Language, tools, cultures and civilizations; science and engineering in the Ancient World; technology in the Middle Ages, with particular reference to feudalism, war, commerce and the clock; architecture and machines in the Renaissance; the scene laid for the Industrial Revolution. **(2 hours a week, first semester; half course).** (Students will be evaluated on a pass/non-pass basis.

G.E. 103b. A History of Engineering—from 1750: Power and materials in the Industrial Revolution; transportation; communications; the growth of the chemical industry; machine tools and the development of the modern factory; the interplay of science and engineering. **(2 hours a week, second semester; half course).** Students will be evaluated on a pass/non-pass basis).

G.E. 104b. Introductory Electricity and Magnetism: Electrostatic field concepts, capacitance, dielectrics, static magnetic field concepts and applications, direct current circuit concepts and analysis techniques, induced electromotive force, magnetic properties of matter. **(3 lecture hours, 3 laboratory hours, second semester; half course).**

G.E. 105a. Engineering Computational Methods: Review of mathematical functions. Computational techniques. Errors in computation. Graphical techniques. Algorithmic methods for digital computation. Fortran programming. **(1 lecture, 2 tutorial hours a week, first semester; half course).**

G.E. 200a. Methods of Computer Computation: The application of digital and analogue computers to the solution of engineering problems including: algebraic, ordinary differential and simultaneous equations, interpolation and curve fitting of data. (Prerequisite: G.E. 105a). **(2 lectures, 3 laboratory hours a week, first semester; half course).**

G.E. 201b. Engineering Analysis I: The selection and analysis of lumped parameter systems by exact and approximate methods is illustrated primarily with systems utilizing mechanical, electrical and fluid components. Analogies are drawn wherever possible. **(2 lectures, 3 hours laboratory a week. second semester; half course).**

G.E. 301a. Engineering Analysis II: The selection and analysis of distributed parameter systems by exact and approximate methods is illustrated primarily through examples involving deformation, wave propagation and vibrations in elastic media and various transport phenomena. Analogues will be discussed and used wherever possible. **(2 lectures, 2 hours laboratory a week, first semester; half course).**

G.E. 302. Practical Experience: Every student must fulfil the requirement of practical experience, normally during the vacation period between third and fourth years. The work that the student proposes to do must be approved by the Director of Industrial Liaison who will, where necessary, consult with the student's counsellor. A report of the vacation work, together with a statement from the employer, should be handed to the Director of Industrial Liaison before December 1st of the student's final year. This will be appraised by the department and, should it not be satisfactory, graduation may be delayed until evidence of adequate practical experience is offered. The student may, if he wishes, submit a report of work performed during an earlier vacation period. However, it is unlikely that work performed during his first vacation will be sufficiently advanced to satisfy the requirements. While it is the student's responsibility to find suitable vacation work, he will be assisted by the Manpower Office, his counsellor, and by the Director of Industrial Liaison.

G.E. 400b. Engineering Profession and Law: The development of the engineering profession; professional engineering associations, societies and services; the status of the engineer in the community; professional ethics. The duties and liabilities of engineers. The law and the engineer; contract law and specifications; preparation of specifications and engineering contract documents. **(2 lectures a week, second semester; half course).**

CHEMICAL ENGINEERING

Officers of Instruction:

Professors: Frank A. DeMarco, Ph.D.
Maurice Adelman, Ph.D. (Head of the Department)
*A. W. Gnyp, Ph.D.
R. A. Stager, Ph.D.

Associate Professors: G. P. Mathur, Ph.D.
C. C. St. Pierre, Ph.D.
M. B. Powley, M.A. Sc.

Visiting Lecturer: J. G. Braks, M.A.Sc.

*On leave.

Course Descriptions

Ch.E. 201b. Chemical Processes: The study of unit processes in chemical engineering and their integration in some selected industries, taught through discussion, laboratory exercise and a research approach to the development of simple known chemical processes on a laboratory scale. **(2 lectures a week, 3 hours laboratory and discussion, second semester; half course).**

Ch.E. 202a. Introduction to Thermodynamics: Fundamental concepts and definitions, First Law, physical properties, ideal and real gases, Second Law and entropy. **(2 lectures a week, 3 laboratory hours alternate weeks; first semester).**

Ch.E. 202b. Introduction to Thermodynamics: Second Law and its implications, thermophysical properties and their determination. **(2 lectures a week, 3 laboratory hours alternate weeks, second semester; half course).**

Ch.E. 202. Introduction to Thermodynamics: A combined course of Ch.E. 202a and Ch.E. 202b.

Ch.E. 203b. Instrumental Analysis: Introduction to physico-chemical measurements. **(2 lectures a week, 3 hours laboratory, second semester; half course).**

Ch.E. 205b. Elementary Process Calculations: Introduction to graphical methods. Stoichiometry, material and energy balances in chemical and metallurgical processes. **(2 lectures, 3 laboratory hours alternate weeks, second semester; half course).**

Ch.E. 301. Transport Phenomena: The simultaneous study of heat and momentum transfer; derivation of the diffusion equation, Laplace's equation, the Navier-Stokes equation and Bernoulli's equation; forced and free convection, laminar and turbulent flow; dimensional analysis; solution of the equations; radiative heat transfer. Laboratory periods embodying experiments and calculations to demonstrate practical problems in heat and momentum transfer. Practical heat transfer; design of heat transfer equipment. Pressure drop and energy requirement calculations, one and two phase systems. The physical separation of solids, screening, filtration, elutriation, fluidization. **(3 lectures, 3 laboratory hours a week, both semesters).**

Ch.E. 301az. Transport Phenomena I: The first half of Ch.E. 301. **(3 lectures, 1½ laboratory hours a week, first semester; half course).**

Ch.E. 302. Chemical Engineering Thermodynamics: The application of thermodynamic principles to chemical engineering practice. **(3 lectures, 1 tutorial a week, both semesters).**

Ch.E. 303. Instrumental Analysis: Physico-chemical measurements used in industry, and the determination of properties. **(1 lecture, 3 laboratory hours a week; both semesters).**

Ch.E. 304. Applied Physical Chemistry: Equilibria in chemically reactive systems, physico-chemical measurements, classification of chemical reactions, computer analysis of rate processes. **(2 lectures, 1½ laboratory hours a week).**

Ch.E. 305. Introduction to Plant Design: Fundamentals of plant design practice; problem solving and decision making for simple chemical processes; the economic considerations. **(3 tutorial hours a week both semesters).**

Ch.E. 401. Mass Transfer: Methods of solution of problems in distillation, extraction, gas absorption, leaching. Introduction to the general theory of transport phenomena. Illustration of the principles of mass transfer operations through laboratory sessions arranged on an incentive basis. **(2 lectures a week, 3 laboratory hours a week; both semesters).**

Ch.E. 403. Process Dynamics and Control: Mathematical modelling, Laplace transform solution of differential equations, transfer functions, feedback control modes, open and closed loop transient response under various control modes, stability, applications to practical Chemical Engineering problems. **(1 lecture, 1½ laboratory hours a week, both semesters).**

Ch.E. 404. Chemical Reaction Engineering: The rate equation, ideal reactor concept. Design of back mix and plug flow reactors. Design considerations for multiple reactions. Heat transfer considerations. Corrections for non-ideality. Introduction to theory of catalysis. Physical factors in heterogeneous reactions. **(3 lectures a week, both semesters).**

Ch.E. 405. Economics and Plant Design: Economic and technical aspects of plant design are covered, along with optimization studies and the effect on a design of the uncertainty of some of the parameters. Scale-up from pilot plants is also studied. **(3 tutorial hours a week both semesters).**

Ch.E. 499. Senior Project: A full literature study on the technical factors involved in the establishing of a chemical industry. Directed experimental research. **(6 laboratory hours a week, both semesters).**

CIVIL ENGINEERING

Officers of Instruction:

Professors: *J. B. Kennedy, Ph.D. (Head of the Department)
C. MacInnis, Ph.D.

Associate Professors: J. P. Hartt, M.S.C.E.
J. T. Laba, Ph.D.
G. Monforton, Ph.D.
J. A. McCorquodale, Ph.D.
G. Abdel-Sayed, Dr. Ing.
S. P. Chee, Ph.D.
J. K. Bewtra, Ph.D.

Assistant Professors: M. C. Temple, Ph.D.
M. K. S. Murty, Ph.D. (Visiting)

*On leave.

Course Descriptions

C.E. 200b. Graphic Statics: An introduction consisting of resolution and composition of forces, force polygons, and equilibrium conditions is followed by a study of funicular polygons; reactions of beams, trusses and three-hinged arches; Maxwell's diagram including substitute members; lines of resistance in dams; and the Williot and Williot-Mohr diagram. (Prerequisites: G.E. 100 and G.E. 101 or equivalents). **(1 lecture hour, 2 laboratory hours a week; second semester; half course).**

C.E. 201. Mechanics of Materials: An introduction to stress, Mohr's circle, strain, stress-strain relations, and a brief discussion of mechanical properties of materials and types of loads. A study of members subjected to axial load, torsion and flexure. Also included is a discussion of eccentric loads, deflection of beams, connections, buckling of columns and additional beam topics. Statically indeterminate problems, and inelastic response are also studied. (Prerequisites: G.E. 101 and Math 114 or equivalents). **(2 lectures a week, 3 laboratory hours alternate weeks; both semesters).**

C.E. 202. Surveying: A complete course in the theory of plane surveying, practical astronomy and the rudiments of aerial photogrammetry. Field problems and computations are provided in the laboratory periods to supplement the lectures. (No prerequisite). **(2 lectures, 2 laboratory hours a week).**

C.E. 203a. Mechanics of Materials: An introduction to stress and strain and stress-strain relations. A brief discussion of mechanical properties of materials and types of loads. A study of members subjected to axial load, torsion and bending. (Prerequisites: G.E. 101 and Mathematics 114 or equivalents). **(2 lectures a week, 3 laboratory hours alternate weeks; first semester; half course).**

C.E. 300. Structural Analysis and Design I:

Analysis: Stability and determinacy of structures; analysis of plane and space trusses; deflections of structures by virtual work, Castigliano and conjugate beam methods; Maxwell-Batti reciprocal theorem; cables, suspension bridges and three-hinged arches; influence lines; approximate analysis of indeterminate structures. Matrix methods of analysis of determinate structures.

Design: Loads acting on a structure; properties of steel and timber; development of specifications and Codes of Practice in steel and timber. **Steel**—tension, compression and bending members, and connections. **Timber**—classification, allowable stresses, fastenings, timber piles, compression and bending members; laminated glued timber. Design of simple structures in steel and timber. (Prerequisites: C.E. 200b and C.E. 201 or equivalent). **(3 lectures, 2 laboratory hours a week).**

C.E. 301. Surveying Camp: A field course covering secondary triangulation; precise base line measurement; plane table topography, cross sectioning and earth work; and observation for time and azimuth. (Prerequisite: C.E. 202 or equivalent). (See "Fees"). **(2 weeks).**

C.E. 302. Hydrology: Hydrologic cycle. Precipitation. Intensity-duration-frequency. Evapo-transpiration losses. Runoff, stream gaging, estimation from meteorological data. Storms, flood flows, rational and unit graph methods, flood routing, weather and water control. (No prerequisite). **(2 lectures a week, first semester; 1 lecture a week, second semester; 3 laboratory hours alternate weeks, both semesters).**

C.E. 303. Soil Mechanics: Index properties of soils, soil structure and classification of soils. Soil compaction and stabilization. Hydraulic principles of flow through soils, seepage, flow nets. Compressibility, consolidation and settlement analysis. Shearing strength, stress analysis and stability of slopes. (Prerequisite: C.E. 201 or equivalent). **(2 lectures a week, 3 laboratory hours alternate weeks).**

C.E. 304. Reinforced Concrete: Stress analysis and design of reinforced concrete beams and columns; combined bending and axial load; ultimate strength and analysis; different floor systems of reinforced concrete building; introduction to prestressed concrete. Laboratory includes design problems and tests of physical properties of concrete and its component materials; design of concrete mixes. (Prerequisite: C.E. 201 or equivalent). **(2 lectures a week, both semesters; 3 laboratory hours, alternate weeks, first semester, and 3 laboratory hours a week, second semester).**

C.E. 305b Construction Methods: The course is divided into three parts. The first part is a discussion of the critical path method (CPM) including time scheduling, manpower and equipment levelling, and updating. This is followed by a discussion of linear programming and its application to engineering problems. The last part of the course includes a discussion of specifications, contract drawings, field inspection, and contract preparation and administration. (No prerequisite). **(2 lectures a week, second semester; half course).**

C.E. 400. Structural Analysis and Design II: Analysis of statically indeterminate structures: superposition, Castigliano theory, column analogy, moment distribution, slope-deflection, matrix methods; influence lines. Design of plate girder; plastic design of steel structures; light gauge cold-formed steel; composite structures; plywood and timber structures. (Prerequisites: C.E. 300 and C.E. 304 or equivalents). **(2 lectures, 3 laboratory hours a week).**

C.E. 402. Advanced Hydraulics: Energy losses due to friction, changes in cross-section and alignment. Pressure conduits in series, parallel and network. Water hammer and surge tanks. Open channel flow, sediment transport and waves. Spillways, weirs and outlet works. Pumps and turbines. Hydraulic models. Gravity and arch dams. (Prerequisite: M.E. 300 or equivalent). **(2 lectures a week, 3 laboratory hours alternate weeks and inspection trips).**

C.E. 403. Foundation Engineering: Earth pressure and design of retaining walls, sheet piling, bearing capacity, stability of slopes, piles and pile driving; cofferdams, caissons; design of reinforced concrete raft and pile foundations. (Prerequisites: C.E. 300 and C.E. 303 or equivalents). **(2 lectures, 1 laboratory hour a week).**

C.E. 404. Transportation Engineering: Highways: Introduction to transportation planning and traffic engineering. Geometric design of highways. Design of rigid and flexible pavements, including foundation soils, sub-bases and bases as well as bituminous and concrete pavements. **Airports:** pavement design, and drainage problems. (Prerequisite: C.E. 201 or equivalent). **(2 lectures a week, both semesters, 3 laboratory hours alternate weeks, second semester).**

C.E. 405. Environmental Engineering: Principles of design, construction, and maintenance of facilities for water supply and waste water removal. Introduction to water purification and waste water treatment practices. Analysis of important characteristics of water and waste water. (Prerequisite: M.E. 300 or equivalent). **(2 lectures, 2 laboratory hours a week).**

C.E. 407. Urban Planning: History of development of cities, various factors influencing the city plan and elements of proper city-planning. The Planning Act, the Department of Planning and Development, and local planning boards. Urban renewal, proper zoning and other legislation that can be employed to develop healthy communities. (No prerequisite). **(1 lecture a week).**

C.E. 408a. Treatment of Experimental Data: Frequency distributions; measure of central tendency and dispersion; probability; discrete and continuous distributions; the Chi, "t", and the "F" ratio tests; linear and non-linear trends; principle of least squares; correlations; tolerance and control charts; introduction to analysis of variance. Applications. (Prerequisite: Mathematics 114 or equivalent). **(2 lectures, 1 laboratory hour a week, first semester; half course).**

C.E. 410. Project and Seminar: Students are required to complete a project based on experimental research, field investigation, or advanced design or analysis. The project is presented orally at a seminar, which is followed by a question period. A written report is submitted for evaluation. **(3 laboratory hours a week).**

ELECTRICAL ENGINEERING

Officers of Instruction:

Professors: P. A. V. Thomas, Ph.D.
*A. H. Qureshi, Ph.D.
M. C. Perz, M.Sc., Dipl. Eng.
E. Kuffel, D.Sc. (Head of the Department)

Associate Professor: W. C. Miller, Ph.D.

Assistant Professors: P. H. Alexander, M.A.Sc.
G. A. Jullien, Ph.D.
M. Shridhar, Ph.D.
R. R. N. Utukuri, Ph.D. (Visiting)

*On leave.

Course Descriptions:

E.E. 200a. Electrical Networks and Systems: Linear two-terminal passive elements, sources, transformers, measurement techniques, network equations, formulation methods. Introductory solution techniques. (Prerequisite: G.E. 104b). **(2 lectures, 3 laboratory hours a week, first semester; half course).**

E.E. 202b. Circuit Analysis I: Signals and waveforms. Network equations. Laplace transforms. Solution techniques. Fourier Analysis. Graph theory. State equations. (Prerequisites: E.E. 200a, Math 211). **(2 lectures, 3 laboratory hours a week, second semester; half course).**

E.E. 205b. Electrical Materials and Devices I: Electrical conductors, semiconductors, insulators, dielectrics and magnetic materials, electronic devices. (Prerequisite: G.E. 104b). **(2 lectures, 3 laboratory hours a week, second semester; half course).**

E.E. 206b. Electronic Circuits I: Linear systems, time and frequency domain analysis. Electronic devices, semiconductors, p-n junctions, three terminal devices, vacuum tubes. Electronic amplifiers, single and multistage, differential amplifiers for transducer signals, frequency response of amplifiers, suitability of amplifiers. Modulation systems, application to measurement problems. **(2 lectures, 2 laboratory hours a week, second semester; half course).**

E.E. 300b. Electromagnetic Theory I: Static electric and magnetic fields. Field mapping. Laws of Coulomb, Gauss, Ampere, and Faraday. Resistance, capacitance and inductance. (Prerequisites: G.E. 104b, Math 361a). **(2 lectures, 2 laboratory hours a week, second semester; half course).**

E.E. 302a. Circuit Analysis II: Linear network and system theory. Network functions. Two-port networks. Network synthesis. Nonlinear network analysis. (Prerequisite: E.E. 202b). **(2 lectures a week, 3 laboratory hours alternate weeks, first semester; half course).**

E.E. 303. Electrical Energy Conversion: Transformers, A.C. and D.C. machines, thermoelectric devices, fuel and radiation cells, fluid energy converters, transducers. (Prerequisite: E.E. 202b). **(2 lectures a week, both semesters; 3 laboratory hours a week, first semester; 3 laboratory hours alternate weeks, second semester).**

E.E. 304a. Electrical Measurements: Measurements of current, voltage and impedance with galvanometers, potentiometers and bridges. Methods of minimizing disturbances and errors. Magnetic measurements. Instrument transformers. Error analysis. (Prerequisite: E.E. 202b). **(2 lectures, 2 laboratory hours a week, first semester; half course).**

E.E. 306. Electronic Circuits I: Linear models for electronic devices. Biasing networks. Single stage amplifiers, circuit analysis programs. Multistage, tuned and feedback amplifiers, oscillators. Nonlinear analysis. Pulse circuits. Transistor logic circuits. (Prerequisites: E.E. 202b, E.E. 205b). **(2 lectures, 2 laboratory hours a week, both semesters).**

E.E. 325b. Switching Circuit Theory: Digital arithmetic. Combinational logic and circuit realisations. Reduction methods. Basic storage methods. Introduction to sequential circuits. **(2 lectures a week, 3 laboratory hours alternate weeks, second semester; half course).**

E.E. 400a. Electromagnetic Theory II: Maxwell's equations. Wave propagation. Transmission lines. Radiation. (Prerequisites: E.E. 300b, Math 217c). **(2 lectures, 2 laboratory hours a week, first semester; half course).**

E.E. 405b. Electrical Materials and Devices II: Electron emission, behaviour of charge carriers in various media and fields. Surface phenomena, ionization, masers, lasers. (Prerequisite: E.E. 205b). **(2 lectures a week, 3 laboratory hours alternate weeks, second semester; half course).**

E.E. 406a. Electronic Circuits II: Operational amplifiers. Integrated circuits. Impedance converters. SCR and TRIAC elements. Terminal characteristics of special electronic components. (Prerequisite: E.E. 306). **(2 lectures a week, 3 laboratory hours alternate weeks, first semester; half course).**

E.E. 407. Control Theory: Principles of feedback control. Stability. Transient and frequency response techniques. Compensation. State-space analysis. nonlinear systems. Sampled data systems. (Prerequisites: Math 217c, E.E. 202b or Math 211). **(2 lectures a week, 3 laboratory hours alternate weeks, both semesters).**

E.E. 408a. Microwave Systems: Transmission line analysis at microwave frequencies. Impedance matching. (Prerequisite: E.E. 300b). **(2 lectures a week, 3 laboratory hours alternate weeks, first semester; half course).**

E.E. 409a. Communications I: Information transmission. Channel characteristics. Modulation systems. Continuous and discrete communication processes. (Prerequisites: Math 217c, E.E. 202b). **(2 lectures a week, 3 hours laboratory alternate weeks, first semester; half course).**

E.E. 409b. Communications II: Statistical properties of signals, correlation theory, detection and estimation theory. Communication systems. (Prerequisite: E.E. 409a). **(2 lectures a week, 3 laboratory hours alternate weeks, second semester; half course).**

E.E. 410. Project and Seminar: The student will undertake a research project involving experimental work in consultation with a faculty member. A satisfactory written and oral report is required for successful completion of this course. **(3 laboratory hours a week, both semesters).**

E.E. 414b. Power Systems: Generation and transmission of electrical energy. Power system components. Power system theory under normal and fault conditions. (Prerequisite: E.E. 303). **(2 lectures a week, 3 laboratory hours alternate weeks, second semester; half course).**

E.E. 425a. Computer Systems I: Introduction to digital and computer organization. Minicomputer machine language and assembly language programming. Introduction to assemblers and compilers. (Prerequisites: E.E. 325b, G.E. 104b). **(2 lectures a week, 3 laboratory hours alternate weeks, first semester; half course).**

E.E. 425b. Computer Systems II: Basic computer design. Data structures. Advanced memories and addressing systems. Input/output methods including analogue. Speed-up techniques. Microprogramming. (Prerequisite: E.E. 425a or C.S. 310). **(2 lectures a week, 3 laboratory hours alternate weeks, second semester; half course).**

E.E. 433a. Analogue and Hybrid Computers: Computing components. Programming. Scaling. Function generation. Iteration techniques. Analogue microprogramming. Conversion. Interface requirements. Hybrid computation. (Prerequisite: E.E. 200a). **(2 lectures a week, 3 laboratory hours alternate weeks, first semester; half course).**

E.E. 460a. High Voltage Engineering: Ionization and decay processes. Breakdown of gas, liquid and solid dielectrics. Generation and measurement of high direct, alternating and surge voltages. Surge protection and insulation coordination. (Prerequisite: E.E. 205b). **(2 lectures a week, 3 laboratory hours alternate weeks, first semester; half course).**

ENGINEERING MATERIALS

Officers of Instruction:

Professors: R. G. Billinghurst, M.A.Sc.
J. Gordon Parr, Ph.D.
W. V. Youdelis, Ph.D. (Head of the Department)

Associate Professor: J. Rezek, Ph.D.

Assistant Professor: D. F. Watt, Ph.D.

Special Lecturer: N. G. Eley, M.Auto.Engin.

Research Appointments: D. C. Gillies, Ph.D.
S. P. Iyer, Ph.D.

Course Descriptions:

E.M. 200b. Introduction to Engineering Materials: The fundamental principles of the structure of matter as applied to engineering materials such as metals and alloys, ceramics, natural and synthetic polymers and elastomers. An introduction to the mechanisms and characteristics of corrosion. **(3 lectures, 3 laboratory hours alternate weeks, second semester; half course).**

E.M. 200bx. Introduction to Engineering Materials: Same as E.M. 200b, but without laboratory.

E.M. 201a. Introduction to Materials Processes: A survey of materials processes supplemented by visits to local industries. **(1 lecture, 1½ tutorial hours a week, first semester; half course).**

E.M. 300. Fundamental Properties of Materials: Atomic structure; states of aggregation; crystal structures; the metallic bond; solidification; dislocations in crystals; alloying theory; phase diagrams; influence of composition, plastic deformation and heat treatment on structure and on properties; precipitation hardening. Metallographic laboratory techniques, polishing, etching, photomicrography. **(2 lectures, 6 laboratory hours a week, first semester; 2 lectures, 3 laboratory hours a week, second semester).**

E.M. 300z. Same as E.M. 300, but with 3 laboratory hours alternate weeks.

E.M. 301b. Metallurgical Thermodynamics and Kinetics: Applications of the principles of thermodynamics, kinetics and heat transfer to selected problems in mineral and metal processes. **(2 lectures, 3 laboratory hours a week, second semester; half course).**

E.M. 303. Ferrous Metallurgy: Modern blast furnace technology. Steelmaking processes. The chemistry and significance of reactions as applied to liquid steel control procedure. Relationship of manufacturing processes to primary product; mechanical properties and constitution of principal iron and steel products; alloy and stainless steels; failure mechanisms in iron and steel products; specifications. **(2 lectures, 1½ laboratory hours a week, first semester; 2 lectures, 3 laboratory hours a week, second semester).**

E.M. 309b. Seminar: Each student will be required to present a seminar in a particular field of his own choice. Formal presentations by staff members or qualified industrial lecturers will be given. Field trips will be arranged to illustrate process topics. **(1½ laboratory hours a week, second semester; half course).**

E.M. 310b. Engineering Metallurgy: Application of the principles of physical metallurgy to the consideration of the constitution, microstructure, heat treatment, properties and uses of ferrous and non-ferrous metals and alloys. Laboratory includes the use of the metallurgical microscope, polishing, etching, demonstration of the principles of solidification, cold working and heat treatment of metals. **(2 lectures, 1½ laboratory hours a week, second semester; half course).**

E.M. 400. Metallurgical Principles and Processes: Advanced principles of thermodynamics and kinetics as applied to metallurgical systems and processes; equilibria criteria and phase relations; Gibbs free energy, activity and activity coefficent determinations for alloy systems; thermodynamic analyses of steelmaking processes; diffusion theory and diffusion controlled processes; solidification principles and application to foundry problems - segregation in ingots and castings. Laboratory: selected problems and processes to illustrate principles. **(2 lectures, 1½ laboratory hours a week).**

E.M. 401a. Mechanical Metallurgy: Introduction to plasticity. A study of the process variables and metallurgical considerations involved in forging, rolling, extrusion, rod, tube and wire drawing, deep drawing, shearing of metals and alloys. **(2 lectures, 1 tutorial hour a week, second semester; half course).**

E.M. 402b. Non-Ferrous Extractive Metallurgy: The beneficiation of ores. Further applications of the principles developed in E.M. 301b to metallurgical processes involved in the extraction and purification of non-ferrous metals. Description of processes employed in Canada. **(2 lectures, 1 tutorial hour a week, second semester; half course).**

E.M. 403a. Fracture: A detailed survey of the physical mechanisms and metallurgical variables involved in brittle and ductile fracture, fracture toughness, embrittlement, creep and fatigue. The techniques of non-destructive testing and fractography. Materials designed to overcome these fracture problems. **(2 lectures a week, first semester; half course).**

E.M. 405b. Ceramics: Production processes of ceramics and glasses. Chemical and physical properties of ceramics, including mechanical and magnetic properties, and the role of these properties in commercial ceramics. **(2 lectures, 1 tutorial hour a week, second semester; half course).**

E.M. 406b. Electrochemistry and Corrosion: Principles and applications of electrochemical engineering in electroplating, electroforming and electrolysis. Factors affecting and determining behaviour of materials under corrosive conditions. Consideration of treatments for protection of metals, control of environment, and use of suitable materials in corrosive environments. **(2 lectures, 3 laboratory hours, second semester; half course).**

E.M. 410. Materials Research Project: Materials research project related to current graduate research; e.g. alloy transformation, solidification of metals (segregation), powder metallurgy, metal composites, constitution of alloys, amalgam metallurgy, electric and magnetic properties of metals and alloys, etc., electrowinning processes—fused salts, aqueous and nonaqueous electrolytes, etc. **(6 laboratory hours a week).**

GEOLOGICAL ENGINEERING

Officers of Instruction:

Professors: *P. Sonnenfeld, Dr. rer. nat. (Head of the Department of Geology)
C. P. Gravenor, Ph.D., F.R.S.C.

Associate Professors: R. K. Jull, Ph.D.
T. E. Smith, Ph.D.
D. T. A. Symons, Ph.D.
P. Hudec, Ph.D.
A. Turek, Ph.D.

Sessional Instructor: M. W. Davis (Mrs.), B.S.

*On leave.

Course Descriptions

Geol. 100. Introductory Course in Geology: Minerals and rocks, geological processes and their results; structure of the earth; practical application of geology; fossils and their use; an outline of the earth's history. **(2 lectures and 2 laboratory hours a week. Field trips).**

Geol. 220. Mineralogy and Crystallography: Principles of crystal structure, morphology and classification of crystals. Chemical and physical properties of minerals. Systematic mineralogy of common members of the major mineral groups. **(2 lectures and 3 laboratory hours a week).**

Geol. 222a. Paleontology: Structure, classification and occurrence of Precambrian to Recent life with special emphasis on the major invertebrate groups. **(2 lectures and 3 laboratory hours a week, one semester; half course, field trips).**

Geol. 222b. Applied Paleontology: The application of fossils to stratigraphy, paleoecology and evolutionary principles. (Prerequisite: Geology 222a). **(2 lectures and 3 laboratory hours a week, one semester; half course; field trips).**

Geol. 336. Structural Geology: Nature of rock structures, mechanics of rock deformation. Methods of solution of structural problems. Regional tectonics. (Prerequisite: Geology 100). **(2 lectures and 3 laboratory hours a week).**

Geol. 337a. Igneous Petrology: The origin, description and classification of the common igneous rocks; their distribution and significance in the evolution of the earth's crust. **(2 lectures and 3 laboratory hours a week, one semester; half course).**

Geol. 337b. Metamorphic Petrology: The origin, description, classification and distribution of the common metamorphic rocks. Metamorphic facies series and the physical conditions under which they form. **(2 lectures and 3 laboratory hours a week, one semester; half course).**

Geol. 338a. Sedimentary Petrology I: Principles of optical mineralogy and introduction to sedimentary mineralogy. Genetic interpretation of sedimentary rocks. Patterns of deposition and diagenesis. Environmental interpretation. (Prerequisite: Geology 100), **(2 lectures and 3 laboratory hours a week, one semester; half course).**

Geol. 338b. Sedimentary Petrology II: Physics of sedimentation, lithofacies analysis. Introduction to techniques of sediment analysis and lithofacies interpretation. (Prerequisite: Geology 338a). **(2 lectures and 3 laboratory hours a week, one semester; half course).**

Geol. 411a. Engineering Geology I: Geology and exploration of common construction materials. Engineering soundness and properties of concrete and bituminous aggregates. Economic, environmental and conservation aspects of aggregate industry. **(2 lectures and 3 laboratory hours a week, one semester; half course).**

Geol. 411b. Engineering Geology II: Geologic hazards in major construction. Engineering properties of various geologic materials. Geologic engineering case history studies. **(2 lectures and 3 laboratory hours a week, one semester; half course).**

Geol. 426. Quaternary Geology: Glacial geology with particular reference to the Pleistocene. Quaternary stratigraphy and chronology of glaciated and non-glaciated regions. **(2 lectures and 2 laboratory hours a week).**

Geol. 434a. Lithostratigraphy: Interpretation of sedimentary sequences including structures in stratified rocks, facies analysis, stratigraphic units, lithofacies and other geologic maps. (Prerequisite: Geology 338). **(2 lectures and 3 laboratory hours a week, one semester; half course).**

Geol. 438. Sedimentology: Processes of sedimentation, sedimentary petrogenesis, environmental interpretation, sedimentation analysis, quantitative and qualitative lithofacies analysis. **(2 lectures and 3 laboratory hours a week).**

Geol. 441a. Economic Geology: Origin, emplacement and geology of metallic mineral deposits and of industrial rocks and minerals. Principles, methods and design of mineral exploration. **(2 lectures and 3 laboratory hours a week, one semester; half course).**

Geol. 442b. Geology of Fossil Fuels: Origin, accumulation and geologic occurence of petroleum hydrocarbons, associated mineral deposits and coal and their methods of exploration. (Prerequisite: Geology 338). **(2 lectures and 2 laboratory hours a week, one semester; half course).**

Geol. 448a. Hydrogeology: Geology of groundwater; chemistry, pollution, rate of flow of phreatic water circulation; hydrodynamics of subsurface waters in saturated porous rocks, erosion and deposition by percolating meteoric and thermal waters. Geological exploration methods for water resources. **(2 lectures and 3 laboratory hours a week, one semester; half course).**

Geol. 457. Geochemistry: Chemical constitution of the earth, processes responsible for the observed geochemical distribution of elements. Physical geochemistry in determination of major and trace elements in rocks. Geochronology. Geochemical prospecting. **(2 lectures and 3 laboratory hours a week).**

Geol. 462. Physics of the Earth: Isostasy and crustal structure, seismology and the earth's interior, thermal constitution of the earth, geomagnetism and geoelectricity, paleomagnetism, exploration geophysics. **(2 lectures and 3 laboratory hours a week).**

Geol. 480c. Field Camp: Geological mapping methods, use of geophysical equipment. A fee of $60 is charged to defray costs of accommodation. (Prerequisite: Geology 336 or consent of instructor). **(2 weeks, after spring examinations, half course).** (May be taken more than once).

Geol. 499. Thesis: Each student will be required to carry out a selected research project and write a report under the supervision of a staff member. **(Equivalent to a full course).**

INDUSTRIAL ENGINEERING (B.A. Sc. in Mechanical Engineering)

Officers of Instruction:

Associate Professors: A. Raouf, Ph.D.
A. A. Danish, M.Sc.

Assistant Professor: C. D. Warmuth, M.Sc.

Adjunct Professor: W. M. Hancock, Dr.Eng.

Special Lecturer: N. G. Eley, M.Auto.Engin.

Course Descrptions:

I.E. 301a. Introduction to Industrial Engineering: Plant organization and management. Definition of management problems. Techniques of solutions, including organization analysis, product development, plant layout, the use of models for comparisons of alternatives. Industrial Relations. **(2 hours lectures and 3 hours laboratory a week, first semester; half course).**

I.E. 301b. Work Analysis and Management: The work system, work simplification, operations analysis, methods improvement. A survey of work measurement, work sampling. Applications to many areas such as business concerns, the home, hospitals, etc. Motion and time study, incentive pay systems. Each area is covered with specific problems. **(2 hours lectures and 3 hours laboratory a week, second semester; half course).**

I.E. 302b. Engineering Applications of Probability and Statistics: Selected topics in statistics with application as an industrial engineering tool for improving product design and manufacturing procedures. **(2 hours lectures and 2 hours tutorial a week, second semester; half course).**

I.E. 303a. Engineering Economy: Engineering decision making viewed from a cost point of view. This will include cost finding, replacement, taxes. **(2 hours lectures, 2 hours tutorial a week, first semester; half course).**

I.E. 304a. Operations Research I: Linear Programming, Network Analysis, Simplex Integer programming. Theory of games. **(2 hours lectures, 3 hours laboratory a week, first semester; half course).**

I.E. 304b. Industrial Engineering Computations: Computational aspects of Industrial Engineering problems using a digital computer. About 5 computational projects will be assigned during the year. **(1 hour lecture and 3 hours laboratory a week, second semester; half course).**

I.E. 401. Production Planning, Management and Analysis: Methods of planning production, Product development and design, Effect of plant-layout and facility design on planning production, Product development and design, Forecasting, Scheduling and Sequencing, CPM and PERT, PERT cost analysis, Elements of control procedure, computer-assisted production control, inventory control (deterministic). **(2 hours lectures, 2 hours laboratory a week).**

I.E. 402a. Operations Research II: Replacement theory, decision theory, inventory theory (probabilistic), Queuing theory, dynamic programming. **(3 hours lectures, 2 hours laboratory a week, first semester; half course).**

I.E. 402b. Industrial Engineering Systems: Systems concept. Systems design and analysis as applied to Industrial Engineering. Applications of O.R. techniques and simulation to the integrated systems of men, machines and materials. **(2 hours lectures, 3 hours laboratory a week, second semester; half course).**

I.E. 403b. Human Factors in Engineering Systems: The application to engineering of the information available concerning vision, illumination, colour, noise atmosphere conditions, physical measurements, and the arrangements of controls and equipment in the areas of work place and equipment design. **(2 lectures, 2 hours laboratory a week, second semester; half course).**

I.E. 404b. Techniques in Management Control: This course studies the uses that can be made of accounting information in engineering and management decision making. **(3 lectures and 2 tutorial hours a week, second semester; half course).**

I.E. 409. I.E. Seminars and Case Studies: To be presented by staff, students and guest speakers. **(2 hours lectures, 1 hour laboratory a week).**

I.E. 410. Project Laboratory: Each student working either individually or in a small group will undertake a project. The project will be assigned or if a student wishes to undertake a project of his own choice, such a project must be approved by the Department. The project may take the form of a written essay with the permission of the Department Head. **(3 laboratory hours a week).**

I.E. 411a. Quality Control: Principles and practice of quality control including double and sequential fraction-defective sampling plans and construction of cumulative sum control chart. **(2 hours lectures, 2 hours laboratory a week, first semester; half course).**

MECHANICAL ENGINEERING

Officers of Instruction:

Professors: W. G. Colborne, M.Sc. (Head of the Department)
T. McDonald, Ph.D.
M. Imber, Eng. S.D. (Visiting)
K. Sridhar, Ph.D.
W. P. T. North, Ph.D.

Associate Professors: Rev. A. R. Howell, C.S.B., M.A.Sc.
*H. J. Tucker, Ph.D.
Z. F. Reif, Ph.D.

*On leave.

Course Descriptions:

M.E. 200a. Renumbered 400b in 1972.

M.E. 202a. Introduction to Thermodynamics: Introduction to the basic laws and terminology upon which the science is based. Examples illustrate the role of thermodynamics in various engineering fields. **(2 lectures, 1½ hours of tutorials a week, first semester; half course).**

M.E. 202b. Engineering Thermodynamics I: Consequences of the 2nd law, availability and irreversibility concepts, chemical reactions and chemical equilibrium. **(1 lecture, 1 hour tutoral, second semester; half course).**

M.E. 300. Fluid Mechanics: Fluid properties and definitions, fluid statics, basic flow concepts, and basic equations, dimensional analysis and similitude. Incompressible viscous flows, exact solutions of Navier Stokes equation, boundary layer equations, Blassius solution, open channel flow, compressible flow, adiabatic and isentropic flows, normal shock. **(2 lectures a week, 3 laboratory hours alternate weeks).**

M.E. 301a. Machine Dynamics: Balancing of rotating and reciprocating masses. Vibrations with one degree of freedom. Vibration of shafts and beams carrying discrete loads; vibrations of elastic bodies. **(3 lectures, and 3 hours laboratory a week, first semester; half course).**

M.E. 302. Engineering Thermodynamics II: An extension of the concepts introduced in M.E. 202a. Applications covering property evaluations for reactive systems and the analysis of various thermodynamic cycles. **(2 lectures and 2 hours tutorial a week, first semester; 2 hours laboratory a week, second semester).**

M.E. 304b. Principles of Heat Transfer: Fourier equation, steady and transient state conduction, forced and natural convection, boiling, heat transfer inside and outside of tubes, radiation, heat exchangers with solutions of practical problems. **(3 lectures, 3 hours laboratory a week, second semester; half course).**

M.E. 305a. Stress Analysis: Theories of failure, stress concentration, energy methods, curved beams, thick cylinders, flat plates, torsion of non circular sections. **(2 lectures, 2 laboratory hours a week, first semester; half course).**

M.E. 311b. [411b] Instrumentation Analysis: Limitations of instruments and errors in measurements. Analysis of data. Measurements to include, motion, vibration, strain, force, flow, temperature and heat transfer. **(2 lectures and 3 hours laboratory a week, second semester; half course).**

M.E. 400b. [200a] **Kinematics:** Velocity and acceleration analysis of mechanisms. Static and inertia forces in mechanisms. Analysis of the reciprocating engine. The cam and follower mechanism. Gear tooth profiles, gear trains. **(2 lectures, 2 hours laboratory a week, second semester; half course).**

M.E. 401. Machine Design: The principles of machine design and the design of machine elements with emphasis on fatigue design. Design topics are selected from: lubrication, bearings, flexible machine elements, springs, fasteners, and power transfer systems. **(2 lectures, 3 laboratory hours a week).**

M.E. 403. Engineering Thermodynamics: Compressible flow, steam power cycles, air compression, refrigeration with applications to air conditioning, gas power cycles, internal combustion engines. **(2 lectures and 3 hours laboratory a week).** [Discontinued in 1972].

M.E. 407a. Control Theory I: Control system concepts, system components. Steady-state and transient analysis. Stability, system design: frequency response, root-locus and analogue simulation methods. **(3 lectures, 3 hours laboratory a week, first semester; half course).**

M.E. 410. Project Laboratory: Each student working either individually or in a small group shall undertake a project in the laboratory. The projects shall be assigned or if a student wishes to undertake a project of his own choice, such a project must be approved by the Department Head. The project may take the form of a written essay with the permission of the Department Head.

M.E. 411b. Renumbered 311b in 1972.

M.E. 413. Thermo-Fluid System Design: A course to illustrate design principles. Examples will be generally taken from the thermo-fluids area and will emphasize optimization including economic considerations. **(2 lectures and 3 hours laboratory, alternate weeks).**

Electives:

M.E. 450c. Gas Dynamics: Basic equations, wave propagation, one dimensional isentropic flows, normal shock, flow with friction, flow with energy transfer, oblique shock, Prandtl Meyer flow, multi-dimensional flow, measurements. **(2 lectures, 1½ hours tutorial a week, one semester; half course).**

M.E. 451b. Dynamics: Kinematics of particles and rigid bodies. Dynamics of particles, systems of particles and rigid bodies, with applications to engineering problems. The gyroscopic effect. Introduction to variational methods, Lagrange's equations, Hamilton's principle. **(2 lectures, 1½ hours tutorial, second semester; half course).**

M.E. 452b. Gas Turbines: Energy transfer between fluid and rotor, diffusers, blade cascade testing and data, compressor and turbine matching, applications. **(2 lectures, 3 laboratory hours, alternate weeks, second semester; half course).** [Discontinued in 1972].

M.E. 454c. Heat Exchanger Design: Application of fluid flow and heat transfer fundamentals to the analysis, synthesis and optimization of heat exchanger design. **(2 lectures, 1½ hours tutorial a week, one semester; half course).**

M.E. 455a. Elasticity: Unsymmetrical bending, shear centre, rotating discs, torsion of non circular sections, beams on elastic foundation, two dimensional theory of elasticity. **(2 lectures, 1½ tutorial hours, first semester; half course).**

M.E. 457b. Control Theory II: A continuation of M.E. 407a dealing with non-linear systems. **(2 lectures, 3 laboratory hours, alternate weeks, second semester; half course).**

M.E. 458c. Environmental Effects and Control of Noise: Physical properties of sound and noise, measurement of noise, noise control, hearing characteristics and environmental effects of noise. **(2 lectures, 1½ hours laboratory a week, one semester; half course).**

M.E. 459c. Design of Air Handling Systems: Design and selection of ducts, fans and outlets as applied to ventilating and air conditioning, control of contaminants, fume hood design and air cleaning systems. **(2 lectures, 1½ hours laboratory a week; half course).**

I.E. 303a. Engineering Economy: (See p. G-34).

Other electives may be chosen from outside the Department. Certain electives are intended to be taken in sequence making the full year course requirement. The choice of electives must be made in consultation with the Department members and approved by the Department Head.

Courses with 450 numbers may be taken during the first year of graduate studies for graduate credit.

Following are details of subjects taught in other Faculties, and required in certain Applied Science programs:

Chemistry 111. General Chemistry and Qualitative Analysis: A course in general chemistry with special emphasis on the physical aspects. The laboratory course consists of general chemistry experiments and qualitative analysis. **(3 lectures, 3 laboratory hours a week).**

Chemistry 223z. Organic Chemistry: A fundamental approach to aliphatic and aromatic chemistry. (Prerequisite: Chemistry 111). **(2 lectures both semesters, 3 laboratory hours a week, one semester; full course).**

Chemistry 302a. Analytical Chemistry: Principles of titrimetric and gravimetric analyses. (Prerequisite: Chemistry 111). **(2 lectures, 3 laboratory hours a week, one semester; half course).**

Chemistry 333x. Intermediate Organic Chemistry: Organic reactions studied as illustrations of the principles of stereochemistry, kinetics and thermodynamics and in terms of their application to synthesis. (Prerequisite: Chemistry 223). **(3 lectures a week; full course).**

Chemistry 433c. Organic Chemistry: Special topics in organic chemistry. (Prerequisite: Chemistry 223 or 223z and consent of instructor). **(2 hours a week, one semester; half course).**

Chemistry 447. Theoretical Chemistry: A brief outline of the classical mechanics and the old quantum theory. Rigorous solution of the Schrödinger equation for simple systems and discussions on the electronic structure of more complex systems. **(2 lectures a week).**

C.S. 231b. Information Structures: An introduction to the abstract structural qualities of information itself, and to methods of representing and using these in a computer, lists, trees, etc. (Prerequisite: one of C.S. 100, 101ab, or G.E. 200c). **(3 lectures a week, one semester; half course).**

C.S. 301a. Simulation and Simulation Languages: An introduction to discrete and continuous simulations of physical systems, and special languages used for this purpose. (Prerequisites: C.S. 231b, Math 211). **(2 lectures, 2 laboratory hours a week, one semester; half course).**

C.S. 331b. Specialized Computer Languages: An introduction to a number of specialized computer languages, including those intended for list processing and string manipulations. (Prerequisite: C.S. 231b). **(2 lectures, 2 laboratory hours a week, one semester; half course).**

C.S. 332. Operating Systems: An introduction to the function and structure of operating systems, introduction to time-sharing systems. (Prerequisite: C.S. 231b). **(2 lectures, 2 laboratory hours a week).**

C.S. 422. Theory of Automata and Formal Languages: Deterministic and probabilistic automata, Turing machines, other types of automata, languages and their representations, grammars and their relationships to automata. (Prerequisites: C.S. 231b and C.S. 310). **(2 lectures, 1½ laboratory hours a week).**

C.S. 431. Language Processors: An introduction to language translators and interpreters. Methods of implementation. (Prerequisite: C.S. 231b). **(2 lecture hours, 2 laboratory hours a week).**

Mathematics 114. Calculus: Differential and integral calculus of algebraic and transcendental functions. Maxima and minima, related rates. Curve sketching in rectangular and polar coordinates. Area, volume, work. Techniniques of integration. Approximate integration. A variety of problems related to engineering. (Prerequisites: Mathematics 010 and 020 or Grade 13 Mathematics 1 and 2). **(3 lectures, 1 hour laboratory a week).**

Mathematics 120a. Linear Algebra: Matrices and determinants, systems of linear equations. Inversion of matrices, quadratic forms. Eigenvalues and eigenvectors. Diagonalization. Vector spaces, linear dependence and independence. Linear transformations. (Prerequisites: Mathematics 010 and 030 or Grade 13 Mathematics 1 and 3). **(2 hours lectures, 1 hour laboratory a week, one semester; half course).**

Mathematics 130b. Vectors and Coordinate Geometry: Scalar and cross products with applications. Lines and planes. Conic sections and quadric surfaces. Translations and rotations. Polar coordinates. Cylindrical and spherical coordinates. Complex numbers. (Prerequisite: Mathematics 120a). **(2 hours lecture, 1 hour laboratory a week, one semester; half course).**

Mathematics 211. Intermediate Calculus, Differential Equations: Improper integrals, infinite series, multiple integration, partial derivatives, line and surface integrals, vector calculus, differential equations, LaPlace transforms. (Prerequisites: one of Math 110, 111, 113, 114, 115; either 130b or 191b). **(3 lectures, 1 tutorial hour a week).**

Mathematics 217c. Complex Variables: Analytic functions, integration, series, contour integration, conformal mapping, boundary value problems, integral transforms. (Prerequisite: Math 113, 114, or 115; Corequisite: Math 211). **(3 lectures, 1 tutorial hour a week, one semester; half course).**

Mathematics 253c. Statistics: Probability theory and introduction to statistical inference. (Prerequisite: one of: Math 113, 114 or 115). **(2 lectures, 1 laboratory hour a week, one semester; half course).**

Mathematics 361a. Fourier Series and Partial Differential Equations: Fourier series and integrals, derivation of some partial differential equations of physics, separation of variables. (Prerequisite: Math 211). **(2 lectures a week, one semester; half course).**

Mathematics 381c. Introduction to Numerical Analysis: Errors in digital computation, approximations, numerical evaluation of functions, interpolation, non-linear equations, simultaneous linear equations, numerical differentiation, numerical quadrature, numerical solution of ordinary differential equations. (Prerequisite: Math 113, 114 or 115; corequisites: Math 211 or 212ab, and C.S. 100). **(3 lectures a week, one semester; half course).**

Physics 228a. Elements of Atomic Physics: Properties of waves, atomic structure, wave nature of matter. This course is recommended for students in the Faculty of Applied Science, and is not available for credit toward a B.Sc. Honours or major degree in Physics. (Corequisites: Mathematics 211, G.E. 101 and 104b, M.E. 202a or Ch.E. 202a or equivalent). **(2 lectures a week, 3 laboratory hours alternate weeks, first semester; half course).**

Physics 228b. Elements of Solid State Physics: Bulk properties of matter, introduction to statistical physics with applications to properties of solids. This course is recommended for students in the Faculty of Applied Science, and is not available for credit toward a B.Sc. Honours or major degree in Physics. (Corequisites: Mathematics 211, G.E. 101 and 104b, M.E. 202a or Ch.E. 202a or equivalent). **(2 lectures a week, 3 laboratory hours alternate weeks, second semester; half course).**

Psychology 454. Industrial Psychology: Personnel selection and performance appraisal, training, managerial decision-making, leadership, communications, job satisfaction, and consumer behaviour. (Prerequisite: Psychology 115 or consent of Instructor). **(3 hours a week).**

Mathematics 129a. Linear Algebra: Matrices and determinants, systems of linear equations. Inversion of matrices, quadratic forms. Eigenvalues and eigenvectors. Diagonalization. Vector spaces, linear dependence and independence. Linear transformations. (Prerequisite: Mathematics 101 and 102 or Grade 13 Mathematics I and II). (2 hours lecture, 1 hour laboratory a week, one semester; half course).

Mathematics 130b. Vectors and Coordinate Geometry: Scalar and cross products with applications. Lines and planes. Conic sections, and quadric surfaces. Translations and rotations. Polar coordinates. Cylindrical and spherical coordinates. Complex numbers. (Prerequisite: Mathematics 120a). (3 hours lecture, 1 hour laboratory a week, one semester; half course).

Mathematics 211. Intermediate Calculus. Differential Equations: Improper integrals. Infinite series, multiple integration, partial derivatives, line and surface integrals, vector calculus, differential equations. Laplace transforms. (Prerequisite: one of Maths 130, 113, 114, 115; Maths 102 or 103). (3 lectures, 1 tutorial hour a week).

Mathematics 215c. Complex Variables: Analytic functions, integration, series, contour integration, conformal mapping, boundary value problems, integral transforms. (Prerequisite: Maths 113, 114 or 115; Corequisite: Math 211). (3 lectures, 1 tutorial hour a week, one semester; half course).

Mathematics 253c. Statistics: Probability theory and introduction to statistical inference. (Prerequisite: one of: Math 113, 114 or 115). (3 lectures, 1 laboratory hour a week, one semester; half course).

Mathematics 361a. Fourier Series and Partial Differential Equations: Fourier series and integrals, derivation of some partial differential equations of physics, separation of variables. (Prerequisite: Math 211). (3 lectures a week, one semester; half course).

Mathematics 381c. Introduction to Numerical Analysis: Errors in digital computation, approximations, numerical evaluation of functions, interpolation, non-linear equations, simultaneous linear equations, numerical differentiation, numerical quadrature, numerical solution of ordinary differential equations. (Prerequisite: Math 113, 114 or 115; corequisites: Math 211 or 212ab, and C.S. 100). (3 lectures a week, one semester; half course).

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Psychology 454. Industrial Psychology: Personnel selection and performance appraisal, training, managerial decision-making, leadership, communications, job satisfaction, and consumer behaviour. (Prerequisite: Psychology 215 or consent of instructor). (3 hours a week).